Carleton
UNIVERSITY

2002/2003
Graduate
Calendar

2002/2003

Graduate

Calendar

carleton.ca

carleton.ca

Carleton University

Code	No.	Building Name
AA	22	Architecture Building
TT	29	Carleton Technology and Training Centr
CC	28	Colonel By Child Care Centre
DT	21	Dunton Tower
GH	18	Glengarry House
GR	14	Grenville House
HP	13	Herzberg Laboratories
NB	16	H.H.J. Nesbitt Biology Building
LH	6	Lanark House
LE	30	Leeds House
LS	25	Life Sciences Research Building
LA	15	Loeb Building
ME	10	Mackenzie Building
ML	2	MacOdrum Library
MB	11	Maintenance Building
MC	27	Minto Centre
PA	3	Paterson Hall
AC	9	Physical Recreation Centre
RH	5	Renfrew House
AB	17	Robertson Hall
RU	14	Russell House
SR	24	Social Sciences Research Building
SA	4	Southam Hall
SP	23	St. Patrick's Building
SC	12	Steacie Building
SD	26	Stormont-Dundas House
TB	1	Tory Building
UC	7	University Centre
CO	19	University Commons

DOW'S LAKE.

ANNIVERSARY PARK

LOT 6

LOT 5

UNIVERSITY DRIVE

CAMPUS AVENUE

LRT

LOT 4

LOT 3

BRONSON AVENUE

RAVEN ROAD

COLONEL BY DRIVE

RIDEAU CANAL

LIBRARY ROAD

GARAGE P9

LOT 2

ALUMNI PARK

LOT 1

LOT 8

RIDEAU RIVER

UNIVERSITY DRIVE

Visitor Parking
Only in These Locations
Parking Garage (P9) levels 2 & 3)
Parking Lot 1
Parking Lot 2
Parking Lot 5
Parking Lot 6
Parking Lot 8
Parking Lot 10
Parking Lot 11

■ Bank
✳ Bookstore and Computer St
● Bus Stops
▲ Carleton University Art Galle
● Entrances to Campus
? Information Carleton
■ Light Rail Station
❖ Post Office
■ Tunnel Entrance: no Stairs
◤ Tunnel Entrance with Stairs
--- Tunnels

Carleton
UNIVERSITY

Faculty of Graduate Studies and Research

Graduate Calendar for the Academic Year 2002-2003

1125 Colonel By Drive
Ottawa, Canada
K1S 5B6
Telephone: (613) 520-2525
Fax: (613) 520-4049

Office of the Dean

Room 1516 Dunton Tower
Telephone: (613) 520-2525
Fax: (613) 520-4049

Dean of Graduate Studies and Research
Roger Blockley

Associate Dean
A. Ghani Razaqpur

Assistant Dean
(Systems and Information Development)
Roy Gibbons

Acting Assistant Dean and Registrar
Carol Corkran

Office Hours
September 1 to August 31
10:00 a.m. - 12:00 noon
1:00 p.m. - 4:00 p.m.

Table of Contents

General Information

Selected Senate Policies

Educational Equity Policy

Preamble

This policy supports Carleton University's commitment to Sections 15 and 28 of the Canadian Charter of Rights and Freedoms, Sections 1, 5 and 14 of the Ontario Human Rights Code, and the University's Statement on Conduct and Human Rights.

Statement of Principles

Carleton University is committed to excellence in teaching, scholarship and research and to providing equity in its educational programs and services.

The University Strives to provide the best possible educational experience for all of its students and to encourage and assist all students to succeed academically and as members of the University community.

The commitment to provide educational equity extends to members of disadvantaged groups as outlined in the University's Statement on Conduct and Human Rights, and includes international students within these categories.

Educational Equity Policy Statement

Carleton University is committed to identifying University policies, programs and services that need to be changed, enhanced or created (subject to the availability of resources) in order to:

Increase the access, retention and graduation of groups of students who have traditionally been under-represented, underserved and/or disadvantaged in University programs; and

Provide and maintain a supportive, hospitable and welcoming educational environment for all students, faculty, staff and associated professionals in the University.

The University is committed to providing accommodation on human rights grounds to students to the point of undue hardship (considering cost, outside sources of funding, if any, and health and safety requirements) and to implementing special measures as required to achieve the University's educational equity goals.

The University undertakes to provide education and training to faculty, staff and students on human rights issues as these relate, inter alia, to curriculum and pedagogy and, through the Office of the Vice-President (Academic), to provide seed funding and/or release time for an initial five-year period to support the development of courses and research within the disciplines reflecting an interest in pluralism and diversity.

Academic Accommodation Policy for Students with Disabilities

Principles

Carleton University is committed to providing access to the educational experience and accommodation to the point of undue hardship in order to promote academic accessibility for individuals with identified and duly assessed disabilities. The University encourages applications from students with those disabilities within the meaning of the Ontario Human Rights Code, including visual, hearing, communication and mobility impairments and learning and other non-visible disabilities.

The University affirms its commitment to the physical accessibility of the Carleton campus, and to the assessment of academic accommodation for students with disabilities in order to maintain its leadership among the province's educational institutions in implementing accessibility.

The Paul Menton Centre for Students with Disabilities (PMC) is the designated unit at the University for assisting the Carleton community in integrating persons with disabilities into all aspects of Carleton's academic and community life. The PMC provides assessment of academic accommodation, advises students on strategies to open a dialogue with instructors and acts as consultant, facilitator, coordinator and advocate in this area for all members of the University community.

The University promotes efforts to accommodate students with disabilities so that they can meet the learning-objectives of courses they are taking and be fairly evaluated in their performance.

For more detailed information on the Policy and associated procedures, please consult with the Paul Menton Centre. The entire text of the Policy is available as part of Carleton University's Human Rights Policy, at the Equity Services Web site: www.carleton.ca/equity/

Policy on Discrimination and Sexual Harassment

Carleton University is a community of faculty, staff, and students who are engaged in teaching, learning and research. Its members are part of the community at large and are governed by the law common to all persons. But membership in the academic community also entails certain rights and responsibilities. The University respects the rights of speech, assembly, and dissent; it prohibits discrimination on the basis of race, ancestry, place or origin, colour, ethnic origin, national origin, creed, sex, sexual orientation, age, marital status, family status, political affiliation or belief, or handicap that is defined as such in the Ontario *Human Rights Code*; it requires tolerance and respect for the rights of others; and it promotes an environment conducive to personal and intellectual growth.

(Please refer to the Offences of Conduct and Academic Standing sections of this Calendar.)

The University

- Academic Dress
- Academic Schedule
- Alumni Association
- Awards and Financial Assistance
  - General Information
  - Awards Administered by Carleton University
  - Awards Tenable at Carleton University
  - Government Aid Programs
  - University Loan Programs
- Carleton International
- Copyright Compliance
- Course Designation System
- Degree Programs
- Electronic Access to the Graduate Calendar
- Fees
- Hours of Operation
- Inventions, Technology Transfer, Intellectual Property and the Graduate Student
- Study Abroad
- Student Participation in Academic Affairs

- Student Services
  - Athletics and Recreation
  - Bookstore
  - Career Services
  - Carleton University Students' Association (CUSA)
  - Chaplaincy
  - Colonel By Child Care Centre
  - Computer Store
  - Computing and Communication Services
  - Equity Services
    - Centre for Aboriginal Education, Research and Culture
    - Mediation Centre
    - Race Equity Office
    - Status of Women
  - Graduate Students' Association
  - Health and Counselling Services
  - Housing and Food Services
  - Library
  - Ombuds Services
  - Paul Menton Centre for Students with Disabilities
  - Student Life Services
  - University Centre
  - Writing Tutorial Service

Electronic Access to the Graduate Calendar

An electronic version of the Graduate Calendar is available on the Internet.

Every effort has been made to ensure the accuracy of this electronic version, but in the case of any discrepancy the printed Calendar shall be considered to be the University's official statement.

The electronic version can be accessed at: www.carleton.ca/calendars/current/ . For those with campus CHAT accounts, the electronic version is also available under the Carleton Information option.

Copyright Compliance

Carleton University is committed to compliance in all copyright matters. Noncompliance is a violation of the *Canadian Copyright Act*. In addition to any actions that might be taken by any copyright owner or its licensing agent, the University will take steps against any breach of this policy.

See www.carleton.ca/ims/copyrig1.html for guidelines on copyright compliance.

Disclosure

The Ministry of Training, Colleges and Universities and Statistics Canada require that Carleton University provide to them information pertaining to a student's status and other selected personal information. Upon registration as a student, one is deemed to agree to the disclosure by Carleton University of the student's status and other selected personal information pursuant to any such requirement.

The University

Carleton University is a contemporary, enterprising university situated in Canada's capital. Undergraduate and graduate programs are offered in the disciplines of arts, social sciences, engineering, and science and through many professional Schools and Institutes. Specialized research is carried out in more than 90 organized research centres. With over 18,000 full-time and part-time students from the National Capital Region, from across the country, and from more than 100 countries around the world, Carleton has acquired a reputation that is world-wide.

Founded in 1942 as a non-denominational, private, co-educational college, Carleton initially occupied a few rented classrooms in church basements and high schools in downtown Ottawa. Full-time programs were offered in 1946 in journalism and public administration. Rapid expansion during the following years led to the development of a new campus on a large and picturesque site between the Rideau River and the historic Rideau Canal.

Carleton's location in Canada's capital has shaped its philosophy and character in a special way. Throughout its history, Carleton has explored the Canadian perspective in many fields and utilized Ottawa's unique resources to give its students an advantage that few other universities enjoy. In the pursuit of academic excellence, Carleton has played a national role in contributing to the quality of public discourse in Canada and to the advancement of our country's international relations. Looking to the future, the University is at the forefront in developing new partnerships, new programs, and new directions in teaching and research that will enable its graduates to lead in meeting the challenges of tomorrow. Forging ties with business, industry, government, and other educational institutions will ensure the most relevant education and most current leading edge research.

The first undergraduate degrees, awarded in 1946, were in journalism and in public administration, and the first graduate diploma in 1954 was in public administration. Today, the University offers graduate instruction leading to the master's degree in more than 50 fields and to the doctorate in more than 20 areas. In 2001/2002, the Faculty of Graduate Studies and Research registered over 2,500 students in graduate level studies.

With outstanding scholars, challenging and imaginative programs, excellent students, libraries, laboratories, and other resources and facilities, the University can provide its students with the most current and relevant education. Graduate programs in Science and Engineering are enhanced by linking resources and expertise with the University of Ottawa to create institutes that are among the finest in the country. Moreover, students in all programs have access to the vast number of scholars working in government organizations and to the special facilities associated with these national and international institutions.

Carleton University's 28 buildings occupy a beautiful 62-hectare campus just 10 minutes drive south of Parliament Hill. A special feature of the campus is an extensive underground tunnel system, which makes the University accessible for students with mobility impairments. The University Library offers a collection of over three million items that includes books, serials, government documents, maps, newspapers, musical scores, compact discs, microforms, archives and rare books. Students access CD-ROM and Web databases for help in finding books and periodicals, and can do their research using our growing collection of e-journals. A leading-edge Web-based library catalogue system is about to be unveiled, greatly improving student access to cyberspace and print research resources.

Reading rooms and special interest resource centres are maintained by many Departments on campus. Accommodation for approximately 2,100 students is provided in Carleton's on-campus residence buildings. A new Residence for senior undergraduate and graduate students was completed this year. Cafeterias throughout the campus offer meals and snacks. The physical recreation complex houses facilities for a wide range of activities from individual fitness to varsity and intramural team competition in a number of sports. Special-interest clubs, public lectures, concerts, films, live theatre, conferences, and conventions bring many dimensions to campus life.

Recreational, cultural, and leisure-time activities to suit every taste abound in the national capital area. The National Arts Centre, the Museum of Civilization, and the National Art Gallery enlighten and entertain in both English and French. Carleton boasts the world's longest winter skating rink, the Rideau Canal, at its doorstep, and kilometres of bike paths and walking trails surround the picturesque campus along waterways and greenbelts.

Degree Programs

The following graduate programs are offered at Carleton:

Graduate Certificate in Conflict Resolution

Graduate Diploma in European Integration Studies

Graduate Certificate in Health and Social Policy in Development

Graduate Diploma in Public Administration (D.P.A.)

Master of Architecture (M.Arch.)

Master of Arts (M.A.)

Anthropology, Applied Language Studies, Canadian Art History, Canadian Studies, Central/East European and Russian-Area Studies, Communication, Comparative Literary Studies, Economics, English, Film Studies, French, Geography, History, International Affairs, Legal Studies, Philosophy, Political Economy, Political Science, Psychology, Public Administration, Religion, and Sociology

Master of Applied Science (M.A.Sc.)

Aerospace, Civil, Electrical, Environmental, Materials, and Mechanical Engineering

Master of Business Administration (M.B.A.)

Master of Computer Science (M.C.S.)

Master of Engineering (M.Eng.)

Aerospace, Civil, Electrical, Environmental, Materials, Mechanical Engineering, and Telecommunications Technology Management

Master of Journalism (M.J.)

Master of Science (M.Sc.)

Biology, Chemistry, Earth Sciences, Information and Systems Science, Mathematics, and Physics

Master of Social Work (M.S.W.)

Doctor of Philosophy (Ph.D.)

Biology, Canadian Studies (joint program with Trent University), Chemistry, Cognitive Science, Comparative Literary Studies, Communication, Cultural Mediation, Computer Science, Earth Sciences, Economics, Engineering (Aerospace, Civil, Electrical, Environmental and Mechanical), Geography, History, Management, Mathematics, Physics, Political Science, Psychology, Public Policy, and Sociology.

Joint programs with the University of Ottawa are offered in the following areas: Civil Engineering, Electrical Engineering, Environmental Engineering, Mechanical and Aerospace Engineering, Biology, Chemistry, Computer Science, Earth Sciences, Mathematics and Statistics, Physics, and Economics.

The Institute of Neuroscience collaborates with the University of Ottawa to offer a Specialization in Behavioural Neuroscience.

The Departments of Biology and Chemistry offer a collaborative program in Chemical and Environmental Toxicology.

The Ottawa-Carleton Institute of Mathematics and Statistics and the Department of Epidemiology and Community Studies at the University of Ottawa collaborate to offer a Specialization in Biostatistics.

The Ottawa-Carleton Institute of Computer Science and the Department of Systems and Computer Engineering participate with ConGESE (Consortium for Graduate Education in Software Engineering) to offer a Specialization in Software Engineering.

The Norman Paterson School of International Affairs and the Common Law Section of the Faculty of Law at the University of Ottawa offer a joint Master of Arts in International Affairs and Bachelor of Laws degree (M.A./LL.B.)

Academic Dress

The academic dress of Carleton University is a compromise between the style of hoods outlined in the American Intercollegiate Code and the dress of ancient foundations of Britain and America.

The master's hood, made of black silk, is of simple or Oxford shape with an open lining of two chevrons (red and black) on a silver field. The border of the hood denotes the degree granted, according to the following colour combinations: arts - white; journalism - white with a black cord sewn slightly in from the lower border; business administration - camel brown with a black cord sewn slightly in from the lower border; science - golden yellow; computer science - royal blue; social work - cream; architecture - cerise; engineering - orange; applied science - orange with a black cord sewn slightly in from the lower border. The Master's gowns, to be worn with the above hoods, are of full length, made of black stuff, with a gathered yoke behind, and long open-fronted sleeves.

The Doctor of Philosophy hood is also made of silk, but completely opened to show the lining, and provided with a purple border. The Doctoral gown is of full style, made of fine royal blue cloth with facings of light blue silk, with a full gathered yoke behind, and closed sleeves with an opening at the elbows.

The gown of the Honorary Doctorate of Laws, Literature, Music, Science, Engineering, Architecture, or Fine Arts is a blue robe with bell-shaped sleeves, made of fine royal blue cloth with facings and sleeves in light blue silk. The hood is made of the same material as the gown, has the same lining as that for the degrees granted by examination, and is bordered with purple for the degree of Doctor of Laws, vibrant blue for the degree of Doctor of Literature, venetian pink for the degree of Doctor of Music, dark red for the degree of Doctor of Science, orange for the degree of Doctor of Engineering, cerise for the degree of Doctor of Architecture, and dark cardinal for the degree of Doctor of Fine Arts.

Inventions, Technology Transfer, Intellectual Property and the Graduate Student

Technology and Research Development Office
1524 Dunton tower
Telephone: (613) 520-2517
Fax: (613) 520-2521

In the course of their research activities, graduate students at Carleton University sometimes make discoveries that have commercial potential. There is a process that enables inventors at Carleton University to seek protection for their ideas and to enter partnerships to seek commercial possibilities.

As soon as preliminary research results exist or when outsiders have expressed interest in your research area or technology, graduate students should contact the Technology and Research Development Office. This office identifies, evaluates, and protects the inventions and technologies developed on campus. It also assists in the transfer of these technologies to the private sector. If you have any questions regarding intellectual property, patents, confidentiality agreements, etc., please contact the Technology and Research Development Office or visit their Webpage at: www.carleton.ca/trdo.

Student Participation in Academic Affairs

Students may become involved in academic issues on campus in several ways.

Students may join the New University Government (NUG). NUG is an organization which gives students direct input into academic decisions by filling the student representative positions at departmental meetings. Students then have direct input into curriculum committees and hiring boards, as well as routine departmental issues. Each department has at least one graduate NUG representative. Departmental NUG representatives also sit on their (specific/respective) Faculty Boards. Each faculty is entitled to send two representatives to the Graduate Faculty Board, and two of these student representatives are elected to the University Senate where most of the general academic decisions are made.

Several Senate policy committees have graduate student representation. These include the Library, Computer, Admission and Studies, University Government, and the Academic Planning committees. There are other Senate committees, but do date they do not have spaces reserved specifically for graduate students.

Finally, there is the Graduate Students Association (GSA) council, where representatives from every department meet not only to discuss academic issues, but to formulate GSA policies on academic matters that may be presented to Senate or other University committees.

To obtain more information on any of these, please call the GSA at 520-6616, or drop by the office, 600 Unicentre.

Academic Schedule

The following schedule contains the dates prescribed by the University Senate for academic activities. Dates relating to fee payment, cancellation of course selections, late charges, and other fees or charges will be published in the Important Dates and Deadlines section of the 2002-2003 Registration Instructions and Class Schedule booklet.

Spring/Summer Term 2002

May 10
Last day for submission to the Office of the Faculty of Graduate Studies and Research of the five (5) final copies of Master's and Ph.D. theses for Spring convocation.

May 15
Spring/summer-term classes begin (full-session and First-term courses).

May 20
Statutory holiday. University closed.

May 23
Last day for registration for spring/summer term. Last day for course changes for First-term evening division courses and for evening division full-session courses. Students who have not yet deposited five (5) final copies of their thesis in the Office of the Faculty of Graduate Studies and Research must register.

June 7
Last day for withdrawal from First-term courses.

June 13-15
Spring Convocation for the conferring of degrees.

June 25
Last day for classes for First term. (Full-session courses resume

June 26-28
First-term final examinations may be scheduled. It may be necessary to schedule examinations for evening classes during the day and vice versa.

July 1
Statutory holiday. University closed. Evening classes missed may meet on July 12.

July 2
Second-term classes begin.

July 26
Last day for withdrawal from full-session courses and Second-term courses.

August 5
Civic holiday. University closed. Evening classes missed may meet August 9.

August 9
Last day for spring/summer-term classes.

August 10-14
Spring/summer-term examinations may be scheduled as announced. It may be necessary to schedule examinations for evening classes during the day and vice versa.

Fall Term 2002

The Faculty of Graduate Studies and Research normally admits students to begin their programs in the Fall term. However, some academic units may consider applicants in the Winter term or the Spring/Summer term. Applications for admission may be submitted at any time. Applications from outside Canada should be completed at least five months before the desired date of admission in order for students to make the necessary visa arrangements.

Applicants wishing to be considered for financial assistance from Carleton University are reminded that they must submit their completed applications before March 1. Please note that some schools and departments may require completed applications prior to March 1. Students must refer to departmental entries in this calendar for details.

August 1
Last day for submission to the thesis supervisor of six (6) examination copies of Master's and Ph.D. theses for Fall graduation.

September 1
Last day for receipt of applications for degrees from potential Fall graduates.

September 2
Statutory holiday, University closed. PrepWeek activities continue.

September 3
Fall term begins.

August 31-September 7
PrepWeek. Academic and social orientation to the campus.

September 3-4
Academic Orientation. All students are expected to be on campus. Class and laboratory preparations, departmental introductions for students, and other academic preparation activities will be held.

Note:
Some graduate courses in joint programs with the University of Ottawa will begin formal classes on this date. Graduate students are advised to check with their departments for details.

September 4
Orientation for Graduate Teaching Assistants.

September 5
Graduate Fall and Fall/Winter classes begin.

September 20
Last day for registration. Students who have not yet deposited the five (5) final copies of their thesis in the Office of the Faculty of Graduate Studies and Research must register.

Last day to change courses or sections for Fall/Winter and Fall-term courses.

October 11
University Day at Carleton. Undergraduate classes suspended.

October 12
Last day for submission to the Office of the Faculty of Graduate Studies and Research of five (5) final copies of Master's and Ph.D. theses for Fall graduation.

October 14
Statutory holiday, University closed.

November 1
Last day to withdraw from Fall-term courses.

November 10
Fall convocation for the conferring of degrees.

December 1
Last day for receipt of applications from potential Winter (February) graduates

Last day for submission to the thesis supervisor of six (6) examination copies of Master's and Ph.D. theses for Winter graduation.

December 2
Last day of Fall-term classes.

Fall Term ends.

December 5-21
Final examinations in Fall term courses and mid-term examinations in Fall/Winter courses will be held. It may be necessary to schedule examinations during the day for classes held in the evening and vice versa.

Winter Term 2003

January 2
Winter term begins.

January 6
Winter term classes begin.

January 17
Last day for late registration for Winter-term courses.

Students who have not yet deposited the five (5) final copies of their thesis in the Office of the Faculty of Graduate Studies and Research must register.

Last day to change courses or sections for Winter-term courses.

January 30
Last day for submission to the Office of the Faculty of Graduate Studies and Research of the five (5) final copies of Master's and Ph.D. theses for Winter (February) graduation.

February 1
Last day for receipt of applications from potential Spring graduates.

February 17-21
Winter Break, classes suspended.

March 1
Last day for receipt of applications for admission from candidates who wish to be considered for the initial award (April) of financial assistance (including Carleton fellowships, scholarships, and departmental assistantships) administered by Carleton University. Candidates whose applications are received after the March 1 deadline date may be eligible for the award of a fellowship, scholarship, or assistantship by reversion.

Last day for submission to the thesis supervisor of six (6) examination copies of Master's and Ph.D. theses for Spring graduation.

March 7
Last day to withdraw from Fall/Winter and Winter-term courses.

April 4
Last day of Fall/Winter and Winter-term classes.

Classes scheduled on this day will be those appropriate to a Friday. Some graduate courses may continue during Review Week until the end of Winter term on April 9.

April 7 - 9
Review Week.

Some lectures, laboratories, review tutorials, etc. may take place.

April 9
Winter term ends.

April 11 - 29
Final examinations will be held. It may be necessary to schedule examinations during the day for classes held in the evening and vice versa.

April 18
Statutory holiday, University closed.

June 12-14
Spring convocation for the conferring of degrees.

2002

JANUARY

S	M	T	W	T	F	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

FEBRUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

MARCH

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JUNE

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

JULY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

OCTOBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

NOVEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

2003

JANUARY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

FEBRUARY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

MARCH

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

APRIL

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

MAY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

JUNE

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

JULY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

AUGUST

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Course Designation System

Prefix Lettering

Course numbers are prefixed by the letter code representing the course discipline, as shown below. For reference purposes, the former two-digit numerical prefixes used prior to September 2002 follow the discipline name.

Prefix	Discipline and former numerical prefix
ANTH	Anthropology (40)
ARCC	Architecture (77)
ARCH	Architecture (76)
ARCU	Architecture (78)
ARTH	Art History (11)
BIOL	Biology (61)
BUSI	Business (42)
CDNS	Canadian Studies (12)
CGSC	Cognitive Science (07)
CHEM	Chemistry (65)
CIVE	Civil and Environmental Engineering (82)
CIVJ	Civil Engineering (joint program) offered at University of Ottawa (83)
CLMD	Cultural Mediations (25)
CLST	Comparative Literary Studies (17)
COMP	Computer Science (95)
EACJ	Electrical Engineering (joint program) offered at University of Ottawa (92)
ECON	Economics (41)
ELEC	Electronics (97)
ENGL	English (18)
ENVE	Environmental Engineering (81)
ENVJ	Environmental Engineering (joint program) (n/a)
EURR	European and Russian Studies (55)
FILM	Film Studies (19)
FREN	French (20)
GEOG	Geography (45)
GEOL	Earth Sciences (67)
GERM	German (22)
HIST	History (24)
IDES	Industrial Design (85)
INAF	International Affairs (46)
ISSC	Interdisciplinary Social Sciences (03)
ISYS	Information and Systems Science (93)
JOUR	Journalism and Communication (28)
LALS	Linguistics and Applied Language Studies (29)
LAWS	Law (51)
MAAJ	Mechanical and Aerospace Engineering (joint program offered at University of Ottawa) (89)
MATH	Mathematics and Statistics (70)
MECH	Mechanical and Aerospace Engineering (88)
MUSI	Music (30)
PADM	Public Policy and Administration (50)
PECO	Political Economy (44)
PHIL	Philosophy (32)
PHYJ	Physics (joint program) offered at University of Ottawa (74)
PHYS	Physics (75)
PSCI	Political Science (47)
PSYC	Psychology (49)
PSYC	Specialization in Neuroscience (49)
RELI	Religion (34)
SOCI	Sociology (53)
SOWK	Social Work (52)
SPAN	Spanish (38)
STAT	Statistics (70)
SYSC	Systems and Computer Engineering (94)
TTMG	Telecommunications Technology Management (96)
WOMN	Women's Studies (44)

Course Numbering Pattern

The course numbering pattern is, in general, as follows:

0001-0099	Courses usually taken in Qualifying University year
1000-1999	Courses usually taken in First year
2000-2999	Courses usually taken in Second year
3000-3999	Courses usually taken in Third year

4000–4999 Courses ordinarily taken in Fourth-year engineering, architectural studies, and fourth-year (honours) arts, social sciences, science, and computer science

5000-5999 Courses ordinarily taken by graduate students

6000-6999 Courses ordinarily taken by graduate students

Hours of Operation

Bookstore

The following hours are subject to change.

Monday to Thursday 8:30 A.M. - 7:00 P.M.

Friday 8:30 A.M. - 4:30 P.M.

Saturday 11:00 a.m.- 4:00 p.m.

Library

The following hours are subject to change.

Fall/Winter Terms
Monday to Friday 8:00 A.M. - 11:00 P.M.

Saturday and Sunday 10:00 A.M. - 11:00 P.M.

Spring/Summer Intersessions
Monday to Friday 8:30 A.M. - 4:30 P.M.

Saturday and Sunday Closed

Summer Term
Monday to Thursday 8:30 A.M. - 10:00 P.M.

Friday 8:30 A.M. - 5:00 P.M.

Saturday Closed

Sunday 12:00 noon - 5:00 P.M.

The Library closes for all holidays except Good Friday and Easter Monday.

For current Library hours, call 520-5621 or visit the Library's Web site at www.library.carleton.ca.

Student Services

Athletics and Recreation

Telephone: (613) 520-4480

The mandate of the Department of Physical Recreation and Athletics is to enhance campus life, spirit, and health by providing a variety of opportunities for high-quality physical activity which meet the needs of students and staff. A balance of programs is offered for all skill and competitive levels, including freelance recreation, instruction programs, intramural sports, and inter-university athletics.

The athletic facilities include an L-shaped fifty-metre pool with diving tower; a Fitness Centre with weight-training equipment, and cardiovascular machines; nine International squash courts; a double gymnasium; a heavy-weight training room; and Combatives and Multipurpose rooms. Outdoor facilities include football and soccer fields, three other playing fields, and five tennis courts. These facilities may be available to students either for recreational needs or for organised competition.

Instructional classes offered include group fitness programs such as aerobics, weight-training, and step aerobics; personal training services; fitness appraisals; aquatics programs such as learn-to-swim, aquafit, and masters' swim; dance; martial arts; yoga and tai chi.

For further information on varsity athletics, competitive club teams and intramurals, contact the Athletics department or visit our Web site at www.carleton.ca/athletics.

Full-time graduate students are eligible for inter-university athletics, subject to league regulations. There is an Athletics Board which advises the Department and the University on matters of athletics and recreation policy through the Office of the President. The Board is composed of members from the Faculty, Administration, Alumni, the Students' Associations, and the Residence Association.

Bookstore

Telephone: (613) 520-3832

University textbooks, stationery supplies, magazines, Carleton merchandise, general books, special orders.

The following hours are subject to change:

Monday to Thursday, 8:30 a.m. - 7:00 p.m.

Friday, 8:30 a.m. - 4:30 p.m.

Saturday, 11:00 a.m.- 4:00 p.m.

Career Services

508 University Centre
Telephone: (613) 520-6611
TDD: (613) 520-3937
Fax: (613) 520-5695
Web site: www.carleton.ca/career
Email: career@carleton.ca

Career Services (CS) is the campus career and employment centre. It provides students and alumni with the resources and materials they need to embark upon their job search. Services provided by this office include:

Job Postings
NEW THIS YEAR – Career Services is pleased to announce their partnership with MonsterTRAK, and the launch of their new on-line job posting service called CarletonTRAK. This new Internet-based campus recruitment tool allows Carleton students and recent grads to have access to full-time, part-time, and summer job postings, internship programs, and Graduate Year Recruitment employment opportunities, 24 hours a day, 7 days a week. CarletonTRAK is a free service for Carleton students and recent grads. It provides easy access to job postings, the ability to upload up to 10 versions of your personal résumé on-line, to apply electronically to employment opportunities, to research various companies, and to gather information on educational institutions, courses and programs. CarletonTRAK can be accessed through www.carleton.ca/carletontrak.html. Visit Career Services for more information about CarletonTRAK, how to register and to obtain the Carleton password to access CarletonTRAK.

Career Counselling and Employment Advising
Career counselling assists students in learning to plan wisely and to handle concerns regarding the selection of academic majors and/or career fields. The Career Planning Workshops are offered to help students become aware of different career fields and how they relate to academic majors. Two assessments are used to assist students acquire knowledge about their personality and interests as they pertain to the world of work. In addition, employment workshops such as Résumé/Cover Letter Writing, Job Search and Networking, and Interview Skills are offered on a weekly basis to prepare students for entry into the workforce. There are drop-ins as well, to provide students with individualized guidance on career and/or employment related concerns. Register to attend our workshops by signing up with our reception staff. Drop-ins are held weekly on a first-come, first-served basis, for up to 20 minutes.

Employment Information Events
Throughout the year, CS organizes a number of career and employment information events for students and recent grads, to provide them

with an opportunity to gather information on career possibilit:es. Two of our larger events include the annual Career Fair, which is held every September, and the annual Summer Job Fair which is held every January. Other events include on-campus visits from employers and associations to discuss career opportunities, information sessions on government employment programs, and presentations from various representatives to provide students and alumni with information about working abroad.

Resource Centre
A resource centre is available for students to research educational, employment, and career planning resources. Materials available include: occupational materials, university and community college calendars, company videos and CD-ROMs, job search materials, newspapers, business periodicals, occupational and labour market trends, and starting your own business guides. The resource centre holds work abroad information, salary information, and assortment of employment directories and information on various associations. Information about other sources of assistance at Carleton and in the greater Ottawa community is also available. A library of materials is available on a loan system. Also, part of the Resource centre is our fully functional 10-station computer lab. Students and recent graduates have access to these computer work stations for résumé and cover letter preparation, researching employers via the internet and accessing full-time, part-time and summer job postings as well as Graduate Year Recruitment opportunities. All postings have targeted employers who are looking to hire Carleton students and recent graduates through CarletonTRAK (www.carleton.ca/career/ carletontrak.html). Students are required to book computer time with the front desk staff and obtain the Carleton password to CarletonTRAK.

Graduate Year Recruitment
Employers from both the private and public sectors recruit Carleton University graduating students for permanent employment opportunities, available at the end of the academic terms. Positions advertised through the program are of a professional nature. Students seeking employment through the Graduate Year Recruitment Program must be in their graduating and final year of studies at Carleton University. The recruiting season takes place during the fall and winter terms. Graduate Year Recruitment job postings are advertised on-line through CarletonTRAK (www.carletontrak.html) under a special feature called InterviewTRAK, which is available only for students who are in the final year of their degree program. Visit the Career Services office for the Carleton password and instructions on how to register on CarletonTRAK. Graduate Year Recruitment information and events, as well as other employment activity will also be advertised through CarletonTRAK, and through our Charlatan ad.

Services for Recent Graduates
All programs and services offered by Career Services are available for recent graduates, up to three years from completion of their degree. Recent graduates are encouraged to post their resume on-line through CarletonTRAK so that they can search and apply for current job opportunities that have been posted by employers who are targeting Carleton alumni. Attending our career and employment workshops will help recent grads make the successful transition from school to the world of work.

Newsletter
Career Services publishes the Explorer, which is filled with invaluable information and articles on career planning, resume preparation, job searching tips and interview techniques. the Explorer will also advertise upcoming employment programs, events and activities scheduled throughout the academic terms. Stay informed: watch for our publication available at Career Services.

Carleton University Students' Association (CUSA)

University Centre 401
Telephone: (613) 520-6688
Fax: (613) 520-3704

The Carleton University Students' Association (CUSA) is an incorporated, student-run organization that promotes the interests of the student body. All registered full or part-time undergraduate students are members of CUSA.

CUSA represents the students' interests to all levels of government and administration. It is also a member of the Canadian Federation of Students (CFS) and CFS-Ontario. These two organizations are committed to bringing about necessary educational, administrative and/or legislative changes in those areas affecting students.

Student services funded wholly or in part or operated by CUSA include: Career and Placement Services (by direct student levy); Carleton Disability Awareness Centre; Carleton Foot Patrol; Gay, Lesbian, Bisexual and Transgendered Centre; Information Carleton; International Students' Centre; Mature and Part-time Students' Centre; New University Government; Off-Campus Students' Lounge; Photo Centre; Womyn's Centre; and the Volunteer Centre.

CUSA business ventures include: Oliver's Pub and Patio; Rooster's Coffeehouse; Unicentre Store; and a Canada Post outlet.

The legislative body of CUSA is a 34 member Students' Council made up of representatives from each faculty and a President and Finance Commissioner who are elected annually by the student population. Elections take place in

February. The term of office is twelve months commencing the following May.

CUSA also sponsors more than 100 clubs and societies, alternate education programs, speaker series, and concerts.

The Students' Association is continually working to improve and expand its scope of activities. Students are encouraged to communicate ideas and opinions to members of their elected representatives in CUSA, to participate and become actively involved in the activities of the Association, and to exercise their voting privileges.

The Chaplaincy

Protestant-Ecumenical Chaplaincy
T28, T30 Tory Tunnel
Telephone: (613) 520-4449
Chaplain, Reverend Tom Sherwood

Roman Catholic Chaplaincy
127G University Centre
Telephone: (613) 520-2896 or 520-2590
Chaplain, Deacon Derek G. Smith

For over three decades a chaplaincy service has existed at Carleton. Part of its function is to share experiences, insights, friendships and our faith. We are also involved in study and discussion groups, community projects, development education, marriage preparation and religious services. In addition, we have connections with many organizations and resources on campus as well as with churches and religious groups in the Ottawa area.

The two principal chaplains (Protestant-Ecumenical and Roman Catholic) are supported by a number of people in the Chaplaincy offices, which are open most days. Appointments are not necessary but at times they are advisable. People are encouraged to visit the offices at any time.

Next to the offices in the Tory Tunnel there is a Quiet Room, which is used for individual meditation, religious services (times posted), and prayer group activity. It is open all day, five days a week. Check with the Chaplaincy office regarding special services.

Colonel By Child Care Centre

Located by the Athletics Complex
Telephone: (613) 520-2715
Fax: (613) 520-3992
Web site: www.ncf.ca.cbccc
Email: cbccc@ncf.ca

Colonel By Child Care Centre, a non-profit parent cooperative located on the university campus, has been providing quality child care to children and their families for over twenty-five years. Our skilled teaching staff provides care and education for 57 children between the ages of 6 months and 5 years year round from Monday to Friday, from 8:00 a.m. to 5:45 p.m. The centre is governed by the parents of enrolled children; cooperative partnerships between parents and staff enrich our programs and promote quality care. Enrolment priority is given to the students, staff and faculty of the university and the centre offers a number of subsidized spaces to families who qualify.

Computer Store

315 Southam Hall
Telephone: (613) 520-3699

The Computer Store, located in Southam Hall, carries a full range of computer products, (including Apple, IBM, NEC Bell, and Compaq computers, printers, modems, and other peripherals) at very competitive prices. Software is also available with educational discounts up to 60% for students, faculty and staff with valid ID card.

Store hours:
Monday to Friday: 8:30 a.m. - 4:30 p.m.
Closed weekends and statutory holidays.
Summer hours are posted at the entrance.

Computing and Communications Services

401 Robertson Hall
Telephone: (613) 520-3700

A wide range of computer services is available to students. Several public computer labs provide access to over 80 different applications software packages, including the Microsoft and Corel Office Suites. Comprehensive data analysis packages such as SAS, SPSS, Maple, NVivo, ArcView and ArcInfo are available for general research applications. All students are eligible for accounts that provide access to e-mail, course discussion groups and the Internet. Laser printing facilities and CD-ROM services are available at the labs on campus. Student Consultants provide help at the labs during peak times, including evenings and weekends.

Complete information about computing on campus is available on the Web at: www.carleton.ca/ccs.

For information or assistance, please visit the CCS Help Desk in 402 Robertson Hall or the Campus Help Desk at MacOdrum Library 4th floor, or call 520-3700. Handouts on various computing topics are available for pick up.

Equity Services

22nd Floor Dunton Tower
Director, To be announced

Equity Services consists of the Centre for Aboriginal Education, Research and Culture, the

Mediation Centre, the Race Equity Office and the Status of Women Office. The role of Equity Services at Carleton is to promote equity, accommodate diversity and prevent discrimination. Proactive work includes workshops on diversity, cultural sensitivity, anti-racism, conflict resolution, mediation, harassment prevention as well as research on aboriginal issues. Each office has an extensive collection of publications and up-to-date research in their respective areas. Staff mediate conflict between individuals or among groups, work to resolve complaints of harassment or discrimination and provide advice to students, staff and faculty.

Equity Services is largely responsible for the implementation of Carleton's new comprehensive Human Rights Policies and Procedures starting in May 2001. This policy outlines our commitment to prevent discrimination and harassment, in sections entitled: "Anti-Racism and Enthnocultural Relations Policy; Gender Equality Policy; Sexual Orientation Equality Policy; and Sexual Harassment Prevention Policy." The new policy also includes a section on Educational Equity which reinforces the university's commitment to "equity in educational programs and services" and designates Equity Services as a resource for students needing accommodation based on religious or parental and family obligations. This policy can be found on our Web site - go to www.carleton.ca/equity.

The Centre for Aboriginal Education, Research and Culture (CAERC)
2205 Dunton Tower
Telephone: (613) 520-2600 ext. 4494
Fax: (613) 520-2512
Director, Dr. John Medicine Horse Kelly

The Centre for Aboriginal Education, Research and Culture, exists to provide Aboriginal students, both from the reserves and from the cities, with a home away from home, a place to connect with other Aboriginal peoples for mutual support and encouragement. CAERC as an Aboriginal organization provides indigenous resources and information to Aboriginal and non-Aboriginal people alike, thus fostering a sense of community and respect among all cultures. CAERC assures Aboriginal representation and presence on campus, provides a base for keeping in touch with Aboriginal events and issues, and promotes awareness of indigenous communities and peoples as participants in ancient, living cultures which remain powerful from time immemorial and into the distant future.

The Mediation Centre
2213 Dunton Tower
Phone: (613) 520-5765
Fax: (613) 520-4024
E-mail: rramkay@ccs.carleton.ca

The Mediation Centre offers assistance to individuals and groups in conflict at the University. Students, staff and faculty can access the Centre for free. Training, group facilitation, mediation, conciliation, chairing of meetings, strategic planning leadership, prevention and de-escalation, team building and problem-solving facilitation, consultation and advice are available upon request from the Centre. The Mediation Centre uses a collaborative problem-solving process by which individuals and groups in conflict identify and resolve their problems with their conflicts with the help of an impartial third party who has no decision-making power. Roommate, landlord-tenant, interpersonal relationships, neighbourhood, sexual harassment, and human rights are some of the disputes handled through the Centre.

Every September, the Centre recruits volunteers among faculty, staff, students and Ottawa South residents and trains them as mediators. Please contact the Centre if you are interested in becoming a volunteer. The Centre also offers academic and teaching support and hosts an annual Symposium on Conflict Resolution in February. Please contact the Centre for more information.

Race Equity Office
2209 Dunton Tower
Telephone: (613) 520-5645
Fax: (613) 520-4037
Co-ordinator, Dr. Edward Osei Kwadwo Prempeh

Carleton University is host to students from various racial, cultural and ethnic backgrounds. The University has a well-established reputation for its commitment to excellence in diversity, and the Race Equity Co-ordinator works collaboratively with a wide range of students, faculty, staff and senior administrators to promote diversity as an institutional value and develop campus-wide educational programs to assist in broadening their knowledge and sensitivity to cultural and racial diversity.

The Office deals with complaints of racial discrimination and harassment and provides a confidential adviser service to complainants. The Office also offers workshops on topics such as employment and educational equity, 'chilly climate,' and racism. These workshops are available to campus groups, student organizations, departments, classes, or by request.

Status of Women Office
2201 Dunton Tower
Telephone (613) 520-5622
Fax: (613) 520-4037

Staff in the Status of Women Office work with various committees on campus to improve women's access to education, employment and services. Assistance is provided in locating childcare, resolving harassment complaints,

personal and campus safety, date rape and sexual assault, lack of accessibility, sexism, employment and education equity, and chilly climate. Services are available to all students, faculty and staff.

Graduate Students' Association

University Centre 600
Telephone: (613) 520-6616
Fax: (613) 520-3680
E-mail: gsa@carleton.ca

The Graduate Students' Association (GSA) represents the collective interests and promotes the general welfare of the graduate students of Carleton University. The Association promotes and maintains communications between the graduate students and the University administration and represents graduate students within the University. The GSA can aid individual graduate students with specific problems related to the University community. The Association also acts to stimulate social, intellectual and political contact among graduate students.

The GSA Council is comprised of annually elected student representatives from each department, a four-member Executive (Internal Directors) and two External Directors. The Council meets on a monthly basis. For more information on becoming a GSA Councilor, contact the GSA office.

The Association owns and operates two separate lounges: Mike's Place ((613) 520-6681), a pub on the second level of the Unicentre; and the Gekko Grotto (ext. 8783), a coffee and computer lounge on the sixth level of the Unicentre. For full information on GSA services, please refer to the Graduate Student Handbook: Manual and Daily Planner, available from the GSA, your department, or Graduate Studies.

Health and Counselling Services

Suite 2600
Carleton Technology and Training Centre
Telephone: (613) 520-6674

Health and Counselling Services is your wellness centre at Carleton University. The centre offers a wide range of services, including treatment of illness, immunizations, birth control information, travel medicine information, a health education program, and much more. Our counselling services has professionally trained counsellors and psychiatrists to help with personal and emotional difficulties. All health records are confidential and will not be released to anyone without client written consent.

Our hours are from 8:30 a.m. to 4:30 p.m. (May - August) and 8:30 a.m. to 5:30 p.m. (September - April). Appointments are

encouraged and may be made in person or by calling (613) 520-6674. If you feel you need medical assistance before an available appointment, please feel free to walk in and a member of our health care team will make an initial assessment and direct further care as needed.

After-hours medical services are available from Holland-Carling After Hours Clinic located at 476 Holland Ave. (at Carling), phone 722-9689. When you call to book an appointment please identify yourself as a Carleton student.

Psychiatrists are available on a referral basis for those requiring psychiatric assessment or care. The services provided are available to all students of the University, and are covered by provincial health insurance.

Counsellors are available to see students on a self-referral basis. Along with regular counselling appointments, our counselling staff offers "drop-in" times daily, for students needing short but immediate contact with a counsellor. Personal counselling can help individuals deal more effectively with emotional and social concerns.

A Health Education Program, promoting healthy lifestyles and wellness, offers on-going workshops presented by trained student peer educators. Topics include, but are not limited to, nutrition, alcohol, sexuality, stress management and smoking cessation. For more information, call the Health Educator at (613) 520-6676.

Health Insurance
1. Ontario Students
Carry your health insurance number with you at all times. If you do not have one, application for coverage must be made directly with the Ministry of Health at 75 Albert Street in Ottawa.

2. Students from Another Province
If you are from outside of Ontario, check that your health insurance is active and carry your number with you at all times. We don't bill you; we bill your provincial insurance plans directly.

3. Students from Outside Canada
The University Health Insurance Plan (UHIP) is compulsory for all international students upon registration. Further information regarding UHIP may be obtained from the foreign student advisor, the International Student Centre or Carleton International.

If you do not have any health insurance, you may be billed for services rendered. The University may withhold the marks of students with outstanding accounts.

Immunization Record
It is recommended that new students:

1. Check with your family physician to ensure adequate immunization. An updated tuberculin skin test is recommended.

2. Obtain documentation of vaccination to red measles, German measles, mumps, polio and tetanus from your family physician. A booster dose of measles/mumps/rubella vaccine is recommended if you have not been re-immunized since infancy.

3. Discuss Hepatitis B vaccine with your family physician. The Medical Office of Health for Ottawa-Carleton region strongly recommends it for all adolescents and young adults.

Housing and Food Services

261 Stormont House

Residences
Telephone: (613) 520-5612
Fax: (613) 520-3952
E-mail address: accommodations@carleton.ca

Carleton's on-campus Residences house 2180 students in two types of accommodation. The traditional residence hall offers accommodation to undergraduate students in single and shared (double) study bedrooms. Bathrooms are shared. As the traditional residence hall makes no provision for meal preparation, all students assigned to this accommodation must participate in a Residence food service meal plan.

The second type of accommodation is a suite-style residence offering single-room accommodation, clustered around shared kitchenette and bathroom facilities. There are two types of suite clusters, consisting of two or four single bedrooms. The suite-style residence is reserved for graduate students and senior undergraduate students, enrolled in their third and fourth year of study. The kitchenettes in the suite-style residence include refrigerators and countertop burners located beneath kitchen exhaust hoods. Students assigned to live in these units may purchase a Residence food services meal plan, at their option.

Regardless of accommodation type, all study bedrooms are furnished with bed and mattress, desk and chair, study lamp, closet and drawer space. Local telephone service for each resident is provided in the Residence fee. Each bed has access to the Residence Ethernet system, which can be activated for an additional fee.

Residence food services meal plans include "Plan A," providing lunch and dinner seven days a week in the Residence dining hall; "Plan B," providing any 12 meals per week (lunch and dinner) in the Residence dining hall and a $300 cash credit on the Campus Card, to be used at any University-operated food service outlet on campus; "Plan C," providing any nine meals per week (lunch and dinner) in the Residence dining hall and a $750 cash credit on the Campus Card. "Plan D" is available only for those assigned to live in the suite-style residence. It

provides any five lunches and dinners in a week, with a cash credit of $400 applied to the Campus Card.

There are no facilities on campus for married students. Graduate students wishing to apply to live in residence should inquire at the office of the Faculty of Graduate Studies and Research.

Off-Campus Housing
Telephone: (613) 520-5614

The Off-Campus Housing Service provides assistance in finding suitable accommodation for students who cannot be accommodated on campus or who are interested in off-campus housing. This service operates primarily on a self-help basis, with listings of accommodation posted outside 261 Stormont House for viewing 24 hours per day, seven days a week. During office hours, staff members are pleased to assist with information and advice. In addition, the Off-Campus Centre, located in 211 Residence Commons Building, operates from 8:30 a.m. - 4:30 p.m. during the months of July and August. Centre staff provide personal assistance and further information.

Each listing includes details about rates and amenities provided. The University does not undertake to inspect or approve any of the facilities listed, so it is strongly advised that the search be undertaken in person. The listings may also be viewed on the Housing and Food Services Web site at www.carleton.ca. This site also includes a "Faculty and Staff Listing" section, listing accommodations of staff members going on sabbatical leave for periods ranging from four months to two years. In addition to the available rental accommodations, a 'looking for' section is also posted.

Food Services
Telephone: (613) 520-5612
Chartwells College & University Dining Services: (613) 520-5618

À-la-carte food service is available in seven locations across campus:
The Food Court, offering Mr. Submarine, Arrriba, Harvey's, Market Grill and Pizza Pizza, second level, University Centre; Ritazza, first level, University Centre; Tim Horton's, fourth level, University Centre The Loeb Cafe, first level, Loeb Building; The Junction, Library precinct, Tunnel level; The Oasis Cafeteria, first level, Residence Commons; The Bent Coin, fifth level, Robertson Hall.

In addition, "all-you-care-to-eat" lunch and dinner is available in the Residence Dining Halls, third-level Residence Commons for the price of admission. Students with Campus Cash plans are entitled to reduced prices and tax exemption where permitted.

Vending machines provide off-hour service. Students with Campus Cash plans can make cash purchases without using cash from many of these machines. A variety of "Campus Cash" plans are available to students, offering savings on campus food purchases through both discounts and tax exemptions.

"Care Packages" provide an easy means for friends and families to send birthday cakes, exam study snacks, or celebrate other special occasions with a food treat.

The catering division of food services is equipped to provide banquet services, receptions, party trays or beverage service for groups of up to 800 guests.

Tour and Conference Centre
Telephone: (613) 520-5611
Fax: (613) 520-3952

Each May through August, the Housing and Food Services Department operates a Tour and Conference Centre. Residence facilities accommodate up to 1,800 guests. A range of services including accommodation, catering, meeting rooms, lecture theatres, all at very reasonable rates, are available to conferences and tour groups.

Accommodation is also available to short-term summer visitors, from the single traveler staying only one night to students and their families who wish to attend or participate in University functions such as Convocation and first-year student Welcome programs. Long-term summer residence (four to sixteen weeks) can be reserved, with one of four available meal plans.

Arrangements for special functions such as wedding receptions, banquets, parties (large and small) and meetings or other special events are co-ordinated by the Tour and Conference Centre, and may be booked throughout the year.

Library

MacOdrum Library
Telephone: (613) 520-5621 (Hours recording)
(613) 520-2735 (Reference and Information)
Fax: (613) 520-2750
Email: university_librarian@carleton.ca
Web site: www.library.carleton.ca

Senior Staff

University Librarian
Martin Foss

Associate Librarian
Linda Rossman

Assistant Librarian (Systems)
Leslie Firth

Department Heads
Gail Catley (Acquisitions), Bozena Clarke (Access Services), Alison Hall, (Cataloguing), Anita Hui (Collections), Susan Jackson (Maps,

Data, and Government Information), Callista Kelly (Interlibrary Loans), Elizabeth Knight (Reference Services), Dorothy Rogers (Gifts)

The Maxwell MacOdrum Library provides access to a wide variety of materials in support of teaching, learning, and research at Carleton. The collection includes more than three million books, journals (print and electronic), government documents, maps, newspapers, music scores, CDs, microforms, archives, and rare materials. Individual and group study space is available for more than 875 readers.

The building is open daily, including evenings and weekends, for over 100 hours a week.

Detailed information on the collection, services, and hours can be found in a series of printed guides available in the Library and on the Library Web site.

Access to Resources
Patrons may access the collection through an online Library Catalogue, which can be searched from computer workstations on each floor of the Library, from computer labs on-campus and personal computers in residence, and via dial-in or Internet from any location off campus.

The Library Web site is specially designed to help students and faculty locate information from a variety of sources. It offers direct access to the on-line catalogue, a large number of Web and CD-ROM databases, electronic journals, catalogues from other libraries, and additional subject-oriented resources.

Assistance in Using the Library
Library staff are available 7 days a week, at two locations on the Main floor: the main Information Desk and MADGIC (Maps, Data and Government Information Centre). Assistance in the use of the collection and other resources is provided. Individual and group orientation tours are given at the beginning of term. Library instruction and subject-related seminars are arranged on request throughout the year.

Services for Students with Disabilities
The Library is wheelchair accessible. The Joy Maclaren Adaptive Technology Centre, which is available to students who are referred by the Paul Menton Centre, is furnished with specialized equipment, adjustable workstations and study carrels. Services offered include use of an elevator key, access to talking book material, and assistance from staff in retrieving library materials and/or using equipment.

Other Library Services
Debit card photocopy machines are located throughout the Library. Equipment is available for reading and printing microform materials. Special requests may be submitted to staff in the Photocopy Centre: colour copies, enlargements, and print copies of exams for the last three years.

On the 4th floor, there are three computer labs where students may access email, the Web and course-related software.

Specialized Collections
- The CBC Newsworld Collection is an archival and research collection of videotaped broadcasts that have been aired since 1991.

- The Reserve Collection contains heavy-demand books and articles that are required course readings.

- Special Collections and Archives is a repository for rare books, manuscripts, and valuable and specialized research materials, like the Batchinsky Collection and Canadian and American Small-Press Poetry.

- MADGIC: Maps, Data and Government Information Centre

  The Government Documents Collection contains official print, microform and digital publications of all levels of government and of international organizations.

  The Map collection consists of topographic and thematic sheet maps, print and digital atlases, air photos and digital orthophotos, and geospatial data files for use with Geographic Information Systems (GIS) software.

  The Data Centre collection comprises microdata files and surveys, including extensive holdings from Statistics Canada and the Interuniversity Consortium for Political and Social Research.

Borrower Information
Books may be borrowed at the Circulation Desk or by using a self-serve machine located on the Main floor. Items, with the exception of reserve materials, circulate 2 weeks (undergraduates) or 4 weeks (4th year Honours and graduates, faculty, staff). Examination grades and transcripts will be withheld from students who owe library fines.

On payment of the appropriate fee, alumni of Carleton University and the general public may purchase a library card that will entitle them to limited borrowing privileges.

Items not available in the Library may be borrowed from other libraries through our Interlibrary Loans Department, or from a commercial Document Delivery Service. Reciprocal library agreements also allow Carleton students access and borrowing privileges at most university libraries in Canada. Some restrictions may apply. For users' convenience, these books can be returned to the Carleton Library.

Students (Graduate and Honours) in science and engineering and selected programs have been granted special onsite and photocopying privileges at CISTI, the premiere science collection

in Canada. To use this service, students must have their library card validated at the Carleton University Circulation Desk.

Ombuds Services

511 University Centre
Telephone: (613) 520-6617
Jim Kennelly
University Ombudsperson

Ombuds Services deals with a variety of grievances and complaints as well as with requests for information. A few examples of the on-campus and off-campus problems include academic appeals, graduation appeals, fee disputes and tenant issues. Financing of this service is provided equally by the University and the Students' Association (CUSA).

Paul Menton Centre for Students with Disabilities

500 University Centre
Telephone: (613) 520-6608
TDD: (613) 520-3937
Fax: (613) 520-3995
Email: pmc@carleton.ca
Web site:www.carleton.ca/pmc

Larry McCloskey - Associate Director, Student Life Services, responsible for the Paul Menton Centre

Nancy McIntyre - Learning Specialist/Co-ordinator, Learning Disabilities

Somei Tam – Learning Specialist/Disability Adviser

Matthew Cole - Co-ordinator, Attendant Services

Academic Accommodation
Carleton University has an Academic Accommodation Policy for Students with Disabilities. This policy promotes efforts to accommodate students with disabilities so that they will have the opportunity to meet learning objectives and be fairly evaluated in their performance. The University is strongly committed to providing access and accommodation for all individuals with identified and duly assessed disabilities. In no case, however, does academic accommodation negotiate away, lower or remove the academic standards and learning objectives of any course or program at the University.

Publications
A series of brochures and flyers on resources and services available to students with disabilities at Carleton University may be obtained from the Paul Menton Centre free of charge. Information is also available online from www.carleton.ca/pmc. Of particular interest to teaching assistants, the PMC also publishes an Instructor and TA Information Booklet that provides useful information for accommodating students with

disabilities in the classroom. Contact the PMC to obtain a copy of this Booklet or view the same information online from our Web site.

Requests for Service

The Paul Menton Centre provides individualized support services, based on appropriate and up to date documentation, to persons who are deaf or hard of hearing, with learning disabilities, attention deficit hyperactive disorder (ADHD), visual impairments, head injuries, physical disabilities including mobility impairments, or who have psychiatric or other medical disabilities.

Students are responsible for applying for special services by making an appointment with the appropriate coordinator. All requests will be considered on an individual needs basis. Students are advised to come to the Centre early in the term to discuss service requests.

Examination Accommodations

Examination accommodations for all tests and examinations (in-class, itv, or formally scheduled) must be arranged by specific deadline dates. Please contact the Paul Menton Centre or visit our Web-site for a list of deadlines for all examinations. Accommodation requests not made prior to the specified deadlines will not be fulfilled.

Library Services for Students with Disabilities

Students referred by the Paul Menton Centre have access to the Joy Maclaren Adaptive Technology Centre, located on the main floor of the MacOdrum Library, Room 232. Heather Cross, Coordinator of Library Services for Students with Disabilities, is located in the department of Reference Services, Room 206 (520-2600, extension 8186). Students are advised to contact her for a complete list of services available in the Library including use of the Centre, research assistance, stacks retrieval, assistance with photocopying, and reserves assistance. Services at the University of Ottawa for students with disabilities are also available to Carleton students. Students must obtain a letter of referral from Heather Cross for each academic year to have access to services at the University of Ottawa.

The Joy Maclaren Adaptive Technology Centre has six workstations on which students have access to various software applications (word processing and spreadsheets), SS-Labs, CUBE, Chat Accounts, Internet Access, the Campus Network, large screen monitors, adjustable-height computer tables, a voice recognition system, screen magnification, screen reading and a scanner.

The Library's contact for alternate format material is Margaret McLeod of the department of Reference Services (520-2600, extension 8943). It is essential to obtain course outlines as early as possible, and to get your requests in early.

Students may scan printed material using the Kurzweil 3000, a reading system that converts printed material into an electronic text format that could read by a voice synthesizer. This reading system is housed in the Joy Maclaren Adaptive Technology Centre.

Assistive Technical Devices

A limited number of note-taking keyboards, two and four-track tape recorders, and personal FM systems are available for loan from the Paul Menton Centre. Speak to a coordinator about your needs.

Students who are Deaf or Hard of Hearing

It is the student's responsibility to initiate early inquiries. If specialized equipment or services, such as personal FM systems or sign language interpreters, are required, please contact the Centre at least a month prior to the start of classes.

Students with Learning Disabilities

It is required that the student have a recent psychoeducational assessment available which has been administered after the age of 16 or within three years of initial registration at the Paul Menton Centre. This will allow Paul Menton Centre staff to organize services that address each individual's particular learning disability.

Students with Attention Deficit Disorder (ADD)

To receive accommodation, students with ADD are required to have formal identification from a psychiatrist, psychologist or physician. For further information contact the Paul Menton Centre.

Students with Mobility Impairments

The campus of Carleton University is well equipped for accommodating persons with physical disabilities. The buildings are in close proximity to each other and most are connected by tunnels. All of the main buildings have elevators and are ramped for outside entrance and egress. Most sidewalks have been made accessible by curb-cut renovations. A building-by-building accessibility inventory is available from the Centre or on the Web site.

Students with Non-Visible Disabilities

Students with non-visible disabilities may have legitimate needs which are not easily recognized or understood within the University community. Students with psychiatric or medical disabilities may wish to contact the Paul Menton Centre to discuss issues of concern to them. Appropriate documentation is required.

Attendant Services Program in Residence for Students with Disabilities

The Attendant Services Program in Residence offers 24-hour assistance with activities of daily living such as personal care, room chores, cafeteria assistance, etc. The program is available to students with various levels of disability and attempts to respond to individuals according to

their specific needs. In order to provide comprehensive services only a limited number of program spaces are available each year. A guide describing the program in detail is available free of charge by contacting the Attendant Services Co-ordinator at (613) 520-6615.

For students who need an accessible room in residence but do not require attendant services, a limited number of rooms are available based on the following criteria: the need for special accommodation, level of disability, whether the applicant has housing alternatives in the area, and the date of application. For further information contact the Accommodations Officer in the Department of Housing and Food Services at (613) 520-5612.

Student Life Services

501 University Centre
Telephone: (613) 520-6600
TDD: (613) 520-3937
Fax: (613) 520-3995
Email: studentlife@carleton.ca
Web site: www.carleton.ca/studentlife

Student Life Services offers a wide range of programs and services to assist students in their adjustment to academic life, in improving their learning strategies, and in making decisions with regard to academic and career concerns. Four units comprise Student Life Services. They are Campus Life Program, Career Services, International Student Advisory, and the Paul Menton Centre for Students with Disabilities.

Campus Life Program
The goals of the Campus Life Program is to assist new students in a variety of areas (e.g., academic, social, emotional, leadership) thereby easing the transition to life at Carleton University. In addition to orientation activities, services and programs are offered throughout the year to support students' academic success, to introduce them to the many resources available on campus and to increase involvement in university life. Campus Life Programming is available to both undergraduate and graduate students.

Study Skills Program
The Study Skills Program coordinates a series of workshops and drop-in hours, which begin in early September. Topics include: Active Reading, Essay Writing, Oral Presentations, as well as general Study Skills workshops covering Note-taking, Time Management and Exam Preparation. These workshops are offered in small groups to accommodate discussion and interaction, and participants have access to individual follow-up if needed.

For individual assistance in a specific study skill area, drop-in times are scheduled. Free brochures on topics such as Time Management, Active Reading, Note-taking, Exam Preparation,

and Study Skills for itv students are available. Students may also view the variety of study skills videotapes offered through the program.

International Student Advisory
The International Student Adviser is available to discuss particular concerns international students may have. An orientation program is held every September and January for incoming international students. Information and assistance concerning university education, financial assistance, UHIP health coverage, immigration regulations, and the general adjustment to a new living situation are available. Please call for drop-in and appointment times.

University Centre

The University Centre (Unicentre) is a non-academic, student-oriented building, which serves as the hub of the campus. It is home to the Carleton University Students' Association and most of its operations (i.e. coffeehouse, pub, convenience store). Its location and atmosphere makes it the perfect meeting place and an ideal setting for events of interest to all students.

In addition to housing CUSA services, the Unicentre is home to: Student Life Services, Information Carleton, Ombuds Services, the Graduate Students' Association, a division of the Ontario Public Information Research Group, and the Paul Menton Centre. Porter Hall, which is available for both on- and off-campus groups to rent, is also located within the Unicentre.

For a more complete list of the services available, please see the section entitled Carleton University Students' Association.

Writing Tutorial Service

The Writing Tutorial Service offers individual and small group tutorials to students who want advice on the writing of university essays. The tutors provide practical instruction on all aspects of the writing process from the initial research and data gathering, to the exploration and organization of ideas, through to the final preparation of the manuscript. In addition, the service regularly presents workshops on style and the general principles of essay writing at the request of Faculty and/or Teaching Assistants. The service is offered free of charge to all Carleton students, part-time and full-time, graduate and undergraduate. For an appointment or information, call (613) 520-6632 or visit 215 Paterson Hall from 8:30 a.m. to 4:30 p.m., Monday to Friday.

Alumni Association

510 Robertson Hall
Telephone: (613) 520-3636
Fax: (613) 520-3587
E-mail: devalum@carleton.ca
Web site: www.carleton.ca/alumni

The Carleton University Alumni Association represents more than 87,000 Carleton alumni worldwide. Membership is automatically extended to all graduates, and is available upon request to former students who have completed 5.0 credits but are no longer registered at Carleton.

The objectives of the association are to advance the excellence and prestige of Carleton University as a distinguished institution of higher learning in Canada, and to encourage a spirit of loyalty, friendship, service and benevolence among the members.

The Alumni Association serves the University by promoting its well-being through contact with graduates, government, the public, faculty, students and potential students. Its members are actively involved in various advisory boards, and as ambassadors for Carleton. It is governed by the Executive Council, a volunteer group. The Alumni Association is represented by 13 branches in major cities across North America, international affiliate groups and 18 active chapters.

The Department of Development and Alumni Services maintains alumni records to ensure a meaningful dialogue between alumni and the University. All graduates with known addresses receive various correspondences from the University including *Carleton University Magazine*, news on events and activities such as Homecoming, and fundraising appeals.

A great way to stay connected to Carleton is to visit our Web site at: www.carleton.ca/alumni. While there, you can join Carleton's award-winning online community of graduates in the Carleton Cafe. This virtual meeting place is where you'll network with old and new friends, post messages, access career and business opportunities, share your views on issues affecting Carleton, catch up on news and events, donate to the university or volunteer through PATRON (Putting Alumni Talent and Resources Online). PATRON is an online database of volunteers who are willing to share their time and expertise with other alumni, students and members of the university community.

The Alumni Association sponsors Homecoming, reunions, an alumni awards program including the graduate and undergraduate Student of the Year Awards, and various chapter and branch activities.

In addition, the University partners with a few select businesses to promote a variety of affinity services to alumni. These services are arranged with the support of the Carleton University Alumni Association and offer members a range of benefits, including an alumni affinity card, life, home and auto insurance, extended health, dental care, financial services, apparel and a variety of on-campus discounts. Funds raised from alumni participation in affinity services help to support student awards and other alumni initiatives such as Alumni Park and the Alumni Wall of Fame. Alumni may opt out of affinity mailings by informing the Department of Development and Alumni Services by email at *devalum@carleton.ca* or by phone at 1-800-461-8972.

Executive Council of the Carleton University Alumni Association for 2001 - 2002:

Gerard Buss, BA/73, *President*
Jennifer Higgins-Ingham, BA/89, BAHons/92, *Past-President*
Jane Gilbert, BJ/80, *Vice-President, Chapters*
Micheline McKay, BA/81, BAHons/83, *Vice-President, Branches*
Brian Ford, BA/80, *Senate Representative*
Jim Watson, BA/83, *Board of Governors Representative*
Mike Colledge, BA/86, *Chair, Services*
Sean O'Neill, BCom/97, MMS/99, *Athletics Board Representative*
Joe Belfontaine, BA/00, *Chair, Homecoming*
Alex Wooley, BA/89, *Chair, Editorial Advisory Committee*

Carleton International

K.J. McGillivray, Director

Dunton Tower 1506
Telephone: (613) 520-2519
Fax: (613) 520-2521
Web site: www.ci.carleton.ca

Carleton International co-ordinates the University's efforts in international activities. Carleton has many formal academic linkages with institutions in other countries. Carleton International administers these on behalf of the University, and many allow graduate students while registered at Carleton to spend a term or a year abroad on academic exchange. Information and applications to participate in an exchange as well as information on scholarship and study opportunities abroad are available through Carleton International. Exchange application deadline is November 30.

Carleton International is also responsible for the negotiation, management and administration of international grants and contracts, liaison with the international and diplomatic community and for the reception of foreign visitors and delegations to the University.

Study Abroad

Carleton has many formal academic linkages with institutions in other countries. Carleton International administers these on behalf of the University. Students have the opportunity to spend a term or a year abroad in partner institutions in Australia, Austria, Brazil, England, Germany, Finland, France, Hungary, Israel, Japan, Mexico, Netherlands, Poland, Russia, Tanzania, Scotland, Slovakia or Wales and take courses accredited towards their Carleton degree. Application forms and scholarship information for study abroad is available through Carleton International, Room 1506 Dunton Tower. Application deadline is usually late November.

Fees

Fees

Tuition Fees and Charges 2002-03

Tuition fees, late charges, and other fees and charges are reviewed in the spring of each year. At the time of printing, tuition fees and charges for 2002-03 were not yet decided upon.

Once fees and charges have been set, specific details will be published on Carleton's Web site by May 1 (www.carleton.ca/fees/) and in the *Registration Instructions and Class Schedule* booklet which is made available to all incoming and returning students in July. Students are advised to familiarize themselves with this information.

Dates Relating to Fees and Charges

Dates relating to tuition fee payments, cancellations of course selections, late charges, and other fees or charges are published in the Important Dates and Deadlines section of the 2002-03 *Registration Instructions and Class Schedule* booklet.

Carleton University Graduate Calendar 2002 - 2003   Pg 31

Awards and Financial Assistance

General Information

Medals

* The Governor General's Medal, Graduate Level

Awarded annually to a graduating student of very high academic standing in a master's or doctoral program of study. Donor: His/Her Excellency the Governor General of Canada. Established in 1988.

* University Medal at the Ph.D. Level

Awarded at each convocation ceremony, when merited, to a graduating student for outstanding academic achievement at the Ph.D. level. Established in 1982.

* University Medal at the Master's Level

Awarded at each convocation ceremony, when merited, to a graduating student for outstanding academic achievement at the master's level. Established in 1982.

Awards Policy

In recent years Carleton graduate students have won a large number of external scholarships from the Social Sciences and Humanities Research Council of Canada (SSHRC), the Natural Sciences and Engineering Research Council of Canada (NSERC), as well as those from the Province of Ontario, such as the Ontario Graduate Scholarships (OGS), and the Ontario Graduate Scholarships in Science and Technology (OGSST). In addition, the University itself provides generous support, and the majority of graduate students receive funds from this source.

Students who hold such awards must pay regular tuition fees unless otherwise stated.

Full-time graduate students at Carleton University are expected to comply with the following procedure. Any full-time graduate student who accepts an award that is not directly administered by Carleton University must immediately inform his/her departmental chair and the Dean of the Faculty of Graduate Studies and Research in writing. This requirement applies to any awards or assistance offered by any agency or institution.

Application Deadlines

March 1 is the last date for receipt of completed applications for admission (including transcripts, letters of reference, etc.) from candidates who wish to be considered for the initial award, announced April 1, of financial assistance administered by Carleton University. However, some departments have earlier application deadlines and students are strongly advised to check with the individual department concerned.

Candidates whose applications are received after the March 1 deadline may be eligible for scholarship and assistantship by reversion.

Method of Payment

All awards administered by Carleton University will be paid on a monthly basis, with the first installment on September 30.

Students are urged to note the above payment dates and be prepared to be financially self-sufficient during the month of September.

Eligibility

In the case of fellowships, grants, scholarships, etc., for which students must make application, it is the individual student's responsibility to establish his/her eligibility. Should it become known that a student is unqualified for any reason, he/she must return the funds already received, with the University assuming no responsibility.

Departments recommending students for internal awards must accept full responsibility for the eligibility of their nominees.

Students are urged to consult carefully the brochures and announcements that specify the conditions associated with tenure of individual awards.

This information is available in the office of the Faculty of Graduate Studies and Research and in departmental offices.

Awards Administered by Carleton University

The awards administered by Carleton University are derived from a variety of sources. Throughout the years, a number of individuals and organizations have contributed substantial funds to the University, through bequests and donations, in order to help support students in various fields of study.

These sums, together with the assistantship funds made available from the University budget, make up the reservoir from which the Carleton scholarships and assistantships are drawn.

It is not always possible to identify precisely the sources of various donations and bequests (often small, but most important in the aggregate) from which any graduate student's financial support has been constructed. In the following cases, however, either because of the relative

importance of the contribution or because of the fact that it is earmarked for a specific type of student or program, we do identify the external source from which the award has originated.

Dick Abbott Memorial Bursary
Awarded annually to a graduate student in the School of Public Administration who is in need of financial assistance. Endowed in 1997 by the faculty and staff of the School of Public Administration in memory of Dick Abbott, a distinguished and long-serving member of the faculty. The recipient will be chosen each year on the recommendation of the Director of the School of Public Administration.

Carl Amberg Fund for International Students
To be awarded annually, on the recommendation of the Dean of Graduate Studies and Research, to an international graduate student in financial need. Endowed in 1997 by Carl Amberg, a former Dean of Graduate Studies and Research whose distinguished career at Carleton was cut short by a sudden stroke in 1980.

Duncan M. Anderson Memorial Bursary
This bursary was endowed in 1992 by colleagues, former students, and friends of Duncan M. Anderson, who was a professor in the Department of Geography from 1964 to 1992. It is awarded annually to a deserving full-time student enrolled in the graduate program in geography who is in need of financial assistance, and whose studies relate to land use planning, resource management, or geographic aspects of the environment.

Application is not required. The recipient will be announced by the Dean of the Faculty of Graduate Studies and Research, on the recommendation of the Chair of the Department of Geography.

The John W. ApSimon Graduate Student Award in Chemistry and Biochemistry
Awarded annually to a graduate student or students under the supervision of members of the Department of Chemistry or the Institute of Biochemistry, who is/are in need of financial assistance to present thesis-related papers at an international conference. The award will be announced by the Dean of Graduate Studies and Research upon the recommendation of the Chair of the Department of Chemistry. Endowed 2000. Donors: Friends, family and colleagues of Dr. John W. ApSimon, former Vice-President (Research and External) and Professor of Chemistry at Carleton University, to recognize his 38 years of contribution to the University and the broader community.

The Association of Palestinian Arab Canadians Graduate Scholarship
This scholarship was established in 1988. It is awarded annually to an outstanding recent graduate of the following Palestinian universities: Bier Zeit, Al-Najah National, Al-Khaleel (Hebron), Bethlehem, The Islamic University of Gazza and Al-Quds (Jerusalem).

The recipient will be chosen by an awards committee chaired by the Dean of the Faculty of Graduate Studies and Research from nominations made by the students' home institutions. It is hoped that the recipient will return to a teaching position in a Palestinian University.

Auto-Carto Six Scholarship
This scholarship is awarded annually to a graduate student in geography studying computer-assisted cartography. The scholarship will be awarded, on the recommendation of the Department of Geography, on the basis of academic merit as determined by the academic index used by the Faculty of Graduate Studies and Research.

BAE Systems Canada Inc. Bursary in Electrical Engineering
This bursary, established in 1987 by Canadian Marconi Company, is available to graduate students in Electrical Engineering who are in need of financial assistance.

Application should be made to the Faculty of Graduate Studies and Research. The recipient will be selected each year by the Dean of the Faculty Graduate Studies and Research.

The Baha'i Community of Canada Bursary for International Students
Established in 2000 by the Baha'i Community of Canada in memory of Mr. Farid Behmardi, this bursary is to assist an international student, registered full-time in a graduate program, who has completed his or her undergraduate degree in the face of adversity and who is in need of financial assistance in order to be able to continue his or her graduate studies.

Walter Baker Fellowship
In honour of the distinguished contribution of the late Walter Baker to Canadian politics, parliamentary life, and public administration, and his long-standing dedication and service to the Ottawa community, Minto Construction Ltd. has established the Walter Baker Fellowship. It is awarded annually to an outstanding student entering the School of Canadian Studies M.A. program. Application is not required; the recipient will be chosen by the graduate awards committee from a list of candidates recommended by the Director of the School of Canadian Studies.

Fred Barkley Special Bursary
This bursary, in the amount of $500, is awarded annually to a graduate student from a developing country who requires special financial assistance in order to study at Carleton University. The recipient of the award will be announced by the Dean of the Faculty of Graduate Studies and Research each year.

Harold Bernstein Memorial Award in Physical Chemistry

This grant, valued at approximately $1,000, will be awarded annually to a student joining the graduate program of the Ottawa-Carleton Institute to study and do research in the area of physical chemistry. It is a one-time scholarship, and is additional to all other stipends or scholarships that the student may hold.

The award is named in honour of Dr. Harold J. Bernstein, eminent spectroscopist and researcher, who retired from the National Research Council, Ottawa, in 1979. Dr. Bernstein served as an adjunct professor of chemistry at Carleton University from 1970 to 1979.

Dr. Thomas Betz Memorial Award

Established in 1990 by family, friends, and colleagues in memory of Dr. Thomas Betz, this award, valued at $1,000, is open to undergraduate and graduate students and is awarded annually, when merited, on the basis of scholarly promise and potential for intellectual leadership. The candidate must have a strong vision of what he/she wants to achieve in life and must be developing or have developed a multi-disciplinary approach in order to achieve this goal. The recipient will be chosen on the recommendation of a selection committee chaired by the Dean of the Faculty of Graduate Studies and Research, from a list of candidates nominated by departments, schools, and institutes.

John Bird Memorial Scholarship

Awarded annually, on the recommendation of the Director of the School of Journalism and Communication, to a graduating student in the Bachelor or Master of Journalism program who has shown the ability and high standards required for objective, carefully researched and responsible reporting. Donor: Estate of Florence Bird. Endowed 1999.

Board of Governors' Graduate Student Bursaries

Established in 1992 by members and friends of Carleton University's Board of Governors on the occasion of Carleton University's 50th Anniversary, these bursaries are available to graduate students who are Canadian citizens and who need financial assistance to cover tuition fees.

Application should be made to the chair/director of the student's academic unit. The final selections will be made by the Dean of the Faculty of Graduate Studies and Research from a list of names recommended by each academic unit.

The Professor B.R. Bociurkiw Prize

To be awarded annually on the recommendation of the Department of Political Science to the undergraduate or graduate student writing the best essay in the field of Ukrainian Politics or church/state relations in Eastern Europe. The prize was established by friends and colleagues to honour Professor Bociurkiw.

The Swithun Bowers Memorial Social Work Bursary

Endowed in 1985, this bursary is available to graduate students within the School of Social Work who are nearing the completion of their program and experiencing financial difficulty in meeting the costs of typing/reproduction of their thesis or independent inquiry project.

The selection of the recipient(s) will be decided on the recommendation of the Director of the School of Social Work.

Peter Browne Memorial Scholarship Fund

This scholarship was established in 1983 by students, friends, and colleagues of the late Professor G. Peter Browne. The recipient will be chosen by the awards committee upon the recommendation of the Department of History from among those students who apply. Preference will be given to deserving history graduate students who are nearing the completion of their thesis.

Building Envelope Council, Ottawa Region, Award

Valued at $200 and established in 1995, this award is given annually, on the recommendation of the Chair of the Department of Civil and Environmental Engineering, to a graduating student in an undergraduate or graduate program of study who has demonstrated excellence in the area of building envelopes.

Dr. John Davis Burton Award

Awarded annually, when merited, to a student in good standing enrolled in a program at Carleton University, University of Ottawa, La Cité collégiale, or Algonquin College who has made a significant contribution toward awareness, equality, and integration of persons with disabilities within his/her educational community. The recipient will be chosen on the recommendation of the Assistant Director (Special Needs), Student Life Services at Carleton University, assisted by a Selection Committee. Endowed in 1992 by students, family, and friends of Dr. John David Burton, who was a champion and advocate for persons with disabilities throughout his career as an educator.

CAL Corporation Scholarship

This scholarship, valued at $2,500, is provided annually by CAL Corporation in honour and memory of Mr. Bev Christie, Mechanical Group Leader, who was a key employee at CAL Corporation until his untimely passing. It is awarded to a student of outstanding performance studying for a graduate degree in electrical engineering who is working in the field of aerospace electronics with an emphasis on microwave technology, antennas, or radar.

Application is not required. The recipient will be selected on the recommendation of the Scholarship Committee, composed of the chair of the department and one other faculty member.

The recipient of the award will be announced in January each year. In a given year, the award may not be made for lack of a suitable candidate, but will be held over so as to allow more than one recipient in a subsequent year.

Don Wilton Campbell Memorial Bursary
An annual bursary, awarded to an M.A. student studying Canadian History who requires financial assistance to cover the costs of research for their thesis in order to complete their studies at Carleton University. The award was established to honour the memory of Don Wilton Campbell, by his daughter Laurie Campbell. Application is not required. The selection of the recipient will be made upon the recommendation of a selection committee comprised of the Department of History Graduate Committee.

Canadian Museum of Nature Graduate Fellowship
Awarded annually to a student or students with high academic standing, registered in a graduate Science program. The recipient must be engaged in research in an area of mutual interest to both the Museum and Carleton. This award is valued at $10,000 per year for a single student, or, if appropriate, for two graduate students at $5,000 per year each.

Application takes place in June of each year. The application should include a description of the proposed project and a letter of support from the applicant's supervisor. The selection of the recipient will be decided on the recommendation by the members of the Joint Museum Carleton Committee.

The Carleton University Academic Excellence Scholarship for International Students
Awarded on admission to academically outstanding international students who are entering either a master's or a doctoral program. Valued at $5,000, payable over twelve months, these scholarships are renewable, subject to satisfactory academic performance, for two years at the master's level and four years at the doctoral level. The scholarship ceases when the student becomes a Canadian citizen or permanent resident. Recipients are selected by the Dean of Graduate Studies and Research on the recommendation of the departments/institutes/schools.

Carleton University Academic Staff Association (CUASA) - Bill Jones Award
This annual award is given one year to a student, either graduate or undergraduate, in any department, who is studying labour or related issues, and in the following year to a graduate student in the Department of Psychology. The scholarship was established in memory of Bill Jones to recognize the outstanding contribution he made to Carleton University and the academic community as a teacher, scholar, Chair of the Department of Psychology, CUASA

negotiator, OCUFA President and Dean of the Faculty of Arts and Social Sciences. The recipient is selected by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the Chair of the Department of Psychology. Endowed in 2000 by friends, colleagues, students and CUASA.

Carleton University Fine Arts Award
Awarded annually upon the recommendation of the Director of the Carleton University Art Gallery with the advice of the Practicum Co-ordinator, Art History, School for Studies in Art and Culture to a graduate or undergraduate student registered for the practicum credit and undertaking a curatorial project. Donor: Kenneth and Margaret Torrance and other friends of the Carleton University Art Gallery. Endowed 1999.

Central/East European and Russian-area Studies Bursary
Awarded annually to one or more deserving graduate or undergraduate students in the Institute of European and Russian Studies who are studying one of the post-communist countries in Central and Eastern Europe or the former Soviet Union. Endowed in 1997 by faculty, staff and friends of the Institute.

This bursary is open only to permanent residents of Ontario, and the recipient will be chosen by the Director of the Institute of European and Russian Studies.

R.F. Chinnick Memorial Scholarship
This scholarship is provided by Telesat Canada in memory of R.F. Chinnick, their former Vice President of engineering and operations. It is awarded annually, where appropriate, to a student enrolled in a graduate program in electrical engineering who is working in the field of satellite communications, or whose work has direct relevance to this area of telecommunications.

It is normally awarded in the second or subsequent year of graduate work, when the student's area of specialization has been well established. It may be awarded more than once to the same student. If an award is not appropriate in a given year, it will be held over so as to allow more than one recipient in a subsequent year.

The Irene Ethel Cockburn Bursary
This bursary, which carries a value of up to $2,000, was established in 1991 and is derived from a legacy of the late Irene Ethel Cockburn. It may be awarded to one or more graduate students who require special financial assistance in order to complete their studies at Carleton University. Application is not required. The recipient(s) will be selected by the Dean of the Faculty of Graduate Studies and Research from a list of candidates recommended by each department.

Scholarship in Comparative Economics

Awarded annually, if merited, on the recommendation of the Chair of the Department of Economics, to a graduate or undergraduate student who has shown aptitude in the field of comparative economics. Endowed in 1991 by Professor Richard Carson in memory of his parents, Robert L. and LeVerne N. Carson.

Odette Condemine Graduate Scholarship in French Canadian Literature

Endowed in 1995 by Professor Odette Condemine, who taught French Canadian Literature at Carleton University until her retirement in 1992, this scholarship is awarded annually, when merited, to the graduate student in the French program who has demonstrated the most promise in French Canadian Literature. Application is not required. The recipient will be announced by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the Chair of the Department of French.

The Stuart Conger - Ontario Graduate Scholarship in Science and Technology (OGSST) in Neuroscience

This scholarship is awarded annually to a graduate student in either a master's or doctoral program who is conducting research in the area of neuroscience. Highly qualified students doing research related to cognitive functions such as problem solving and decision making as well as those researching physiological, anatomical and biochemical determinants of cognitive functioning within the normal human and infra-human population may be eligible.

The scholarship is valued at $15,000 annually, or $5,000 for each of three consecutive academic terms. The recipient must meet the criteria for the Ontario Graduate Scholarship in Science and Technology (OGSST) and will be selected by the Dean of the Faculty of Graduate Studies and Research.

Helen and Joe Connolly Bursary

To be awarded annually to a deserving graduate student in Canadian history in need of financial assistance. Consideration for the award will be given on the basis of academic achievement combined with an interest in community involvement and extracurricular activities. Endowed in 1997 by Helen and Joe Connolly. The recipient will be selected by the Chair of the Department of History. Department of History Graduate Student Bursary

To be awarded annually to a graduate student in History who is in need of financial assistance. Endowed in 1997 by the faculty, staff and friends of the Department of History. The recipient will be selected by the Chair of the Department of History.

The Harold Crabtree Foundation - Ontario Graduate Scholarship (OGS)

Established in 2001 by The Harold Crabtree Foundation, this $5,000 scholarship given over three academic terms is awarded to a student in the Ph.D. program in Canadian Studies who has been awarded an Ontario Graduate Scholarship in the amount of $10,000 in an academic year. The winner is selected by the Director of the School of Canadian Studies.

The Dean of Graduate Studies Entrance Scholarship for Academic Excellence

Awarded on admission to domestic students who have demonstrated academic excellence and are entering either a master's or doctoral program. Valued at $2,000, the scholarship is payable over eight months in the first year of a program of graduate studies. Recipients are selected by the Dean of Graduate Studies and Research on the recommendation of the departments/institutes/schools.

Department of History Graduate Student Bursary

To be awarded annually to a graduate student in History who is in need of financial assistance. Endowed in 1997 by the faculty, staff and friends of the Department of History. The recipient will be selected by the Chair of the Department of History.

This bursary is open only to permanent residents of Ontario.

Department of Sociology Graduate Student Bursary

Endowed in 1997 by the faculty and staff of the Department of Sociology and Anthropology, this bursary is awarded annually to a graduate student in Sociology who is in need of financial assistance. The recipient is chosen by the Chair of the Department of Sociology and Anthropology.

Director's Book Prize in Canadian Studies

This award, valued at $100, is presented annually to a graduate student enrolled in the first year of the Master of Arts program in the School of Canadian Studies. Application is not required. The recipient will be chosen by the Director of the School of Canadian Studies.

Emmett Dunne Scholarships

Endowed in 2000 by the estate of Mr. Emmett John Dunne (B.A. 1956), these scholarships are awarded annually to graduate students in Chemistry. A minimum of two scholarships, each to the value of $3,000 over one academic year (3 terms), are awarded on the recommendation of the chair of the Department of Chemistry, to graduate students registered in the Department of Chemistry.

The recipients of this scholarship may be eligible for consideration for an Ontario Graduate Scholarship in Science and Technology (OGSST), which, if it were awarded, would raise the scholarship to $9,000 over three terms. If an OGSST is awarded, the OGSST guidelines will apply to this scholarship.

Davidson Dunton Memorial Student Assistance Fund
Established in 1987 by relatives, colleagues, and friends of the late Davidson Dunton, Carleton's fourth and longest serving President and a Director of the School of Canadian Studies. This fund is available to graduate students within the School of Canadian Studies who are experiencing financial difficulty meeting the costs of typing/reproduction of their thesis or other research papers, attendance at conferences, or other approved special needs.

The selection of the recipient(s) will be made upon the recommendation of the Director of the School of Canadian Studies.

Rachael Elizabeth Edwards Memorial Award
Awarded annually, on the recommendation of the School of Journalism and Communication, to an outstanding student completing the first year of the Master of Journalism program. Preference will be given to a female student who has indicated an interest in pursuing a career in the daily newspaper field.

Endowed in 1974 in memory of Rachael Elizabeth Edwards, a former student in the School of Journalism and Communication. Revised in 1987.

The Hendrika Alice Eisen Memorial Fund
This fund was established in 1990 by friends, co-workers, and relatives of the late Hendrika Alice Eisen, a graduate student in the Department of Psychology who was working in the interdisciplinary area of computer interface design.

In memory of the interdisciplinary nature of her interests and the high regard she had for the annual conference in computer-human interactions (CHI) presented by the Special Interest Group SIGCHI of the Association of Computing Machinery, this fund is to assist graduate students interested in attending this annual conference. Application for assistance with travel or accommodations can be made to the office of the Faculty of Graduate Studies and Research. Preference will be given to students presenting posters or papers at CHI and who are acting as student volunteers at the conference. The award is open to students from any discipline who are interested in attending the CHI conference.

The David and Rachel Epstein Foundation Fellowship: Equal Pay for Work of Equal Value
Established in 1985, this fellowship is open to students studying in any discipline within the social sciences or humanities to support a master's or doctoral student in a thesis program. The thesis should be on the topic of "equal pay for work of equal value", and should have a strong empirical basis with application to Canadian work settings.

Valued at $6,000, this fellowship is provided by part of the income from the David and Rachel Epstein Fund. It will be awarded on the basis of academic merit as determined by the Faculty of Graduate Studies and Research from a selection of applicants who have submitted a research proposal related to the above. Departments will be asked by the selection committee to nominate suitable candidates. In a given year, the award may not be made for lack of a suitable candidate.

David and Rachel Epstein Foundation Scholarships
Part of the income from the David and Rachel Epstein Foundation Fund, which was established in 1970, has been designated to provide scholarships for outstanding graduate students at Carleton University.

Up to twenty scholarships valued at $1,000 will be awarded annually to students from a list of candidates recommended by each department. Application is not required.

Fluorosense Inc. Scholarship in Chemistry
Two scholarships, each to the value of $3,000 over one academic year (three terms), are awarded annually, on the recommendation of the Chair of the Department of Chemistry, to graduate students specializing in inorganic or materials chemistry.

Endowed in 1999 by the founder of Fluorosense Inc., a company that specializes in custom instrumentation. The recipients of this scholarship may be eligible for consideration for an Ontario Graduate Scholarship in Science and Technology (OGSST), which, if it were awarded, would raise the scholarship to $9,000 over three terms. If an OGSST is awarded, the OGSST guidelines will apply to this scholarship.

Harriet and Eugene Forsey Scholarship
This scholarship was established in 1993 by the Canadian Federation of University Women/Ottawa in memory of the mutual fidelity of the Forseys. Senator Eugene Forsey was a recognized expert on the Canadian Constitution and a lecturer in Carleton's Political Science Department for many years.

Valued at $1000, this scholarship is awarded annually, when merited, to a graduate student in the Political Science program who is working in the area of the Canadian Constitution. Application is not required. The recipient will be announced by the Dean of the Faculty of Graduate Studies and Research, on the recommendation of the Chair of the Department of Political Science.

Friends of Art History Book Award
Endowed in 1994 by the Friends of Art History, this award, valued at $100, is presented annually to a graduate student enrolled in the Master of Arts program in Canadian Art History. Application is not required. The recipient will be chosen on the recommendation of the Art History Graduate Committee.

GAC-MAC Graduate Scholarship in Earth Sciences

This scholarship was endowed by the Geological Association of Canada and the Mineralogical Association of Canada in recognition of the support provided by the Ottawa-Carleton Geoscience Centre when Carleton University hosted the "Ottawa 86" Annual GAC-MAC Meeting.

It will be awarded annually to a graduate student enrolled in the Ottawa-Carleton Geoscience Centre. Application is not required. The recipient will be selected by the Board of Management of the Ottawa-Carleton Geoscience Centre.

Indira Gandhi Memorial Fellowship

This fellowship, to the value of approximately $10,000, was established in 1985 by friends of India to honour the memory of Mrs. Indira Gandhi, Prime Minister of India, 1966 -1977 and 1980 -1984.

This award is awarded annually to an outstanding (preferably foreign) student enrolled in a graduate program. No application is required for this fellowship. The recipient will be chosen by an awards committee chaired by the Dean of the Faculty of Graduate Studies and Research from candidates recommended by departments, schools, and institutes having graduate programs.

The Michel Gaulin Travelling Bursary in the Humanities

The purpose of this bursary is to assist in defraying the costs of research-related travel for a graduate student in the humanities (languages and literatures, linguistics, history, philosophy, religion, art and culture, and Canadian Studies). The criteria for the award are academic excellence and a clear statement of the benefits for the student's research of the proposed travel. The bursary will be awarded by the Dean of Graduate Studies and Research upon the recommendation by the Department. Donated by Dr. Michel Gaulin, a former Professor of French and Clerk of Senate at the University.

Randall Geehan Memorial Scholarship in Quantitative Economics

Awarded annually, on the recommendation of the Chair of the Department of Economics, to a deserving fourth-year honours student or graduate student whose studies emphasize quantitative work in economics. Endowed in 1990 by colleagues, family, and friends in memory of Dr. Randall Geehan, who was a professor in the Department of Economics.

W. Irwin Gillespie Graduate Scholarship in Economics

Awarded annually to the most outstanding Ph.D. student in the Economics program, preference is given to a student whose study focuses on public economics. The scholarship was established in 2001 by the Taylor-Ebanks family in memory of Professor W. Irwin Gillespie, a member of the

Department of Economics from 1964 to 1997. Dr. Marvin Taylor, a member of the family, was the last Ph.D. student Professor Gillespie supervised before he passed away.

Murray Goldblatt Master of Journalism Scholarship

Awarded annually, in the amount of $500, on the recommendation of the Director of the School of Journalism and Communication, to a student proceeding from first to second year in the Master of Journalism program, who shows the best potential as a journalist. Funded by a bequest from the estate of Murray Goldblatt, who shared his experience and passion for the media as a professor at Carleton for 19 years.

Lois Gonyer Bursary

Awarded annually, on application and on the recommendation of the Director of the School of Canadian Studies, to a Canadian Studies graduate student whose program is threatened because of financial need. Established in 1988 by friends and colleagues of Lois Gonyer and funded by them and institute graduates in recognition of her twenty-seven years of service as administrator in the School of Canadian Studies.

Graduate Scholarship in Civil Engineering

This award is made possible by contributions from staff and faculty employees in Civil Engineering as well as from other donors. The award, valued at up to $500, will be provided annually to an outstanding undergraduate student at Carleton who enrolls in a graduate program in the Department of Civil and Environmental Engineering. No application is required. The recipient will be selected by a scholarship committee composed of the Chair of the Department of Civil and Environmental Engineering, the departmental supervisor of graduate studies, and two other faculty members from the Department of Civil Engineering.

Graduate Student Research Fund

Application forms are available in the office of the Awards Specialist, Faculty of Graduate Studies and Research. Each application must include a letter of support from the supervisor. The student is responsible for providing a brief description of the research project underway, a research plan outlining the need for requested funds, and a full budget. The student must be registered in the thesis or major research project in the term in which funding is requested. There is no application deadline.

The Fund is intended to cover modest research where other sources of support are not available. Eligible costs include translation, mailing, field travel, supplies, long-distance telephone charges and questionnaire production. Costs associated with interview subjects, honoraria or related expenses are not eligible. While the cost of copying the thesis itself is not eligible, the cost of copying journal articles in a library or archive is an eligible research expense under the terms of the fund.

The maximum amount awarded is up to a maximum of $500 per research/thesis project.

Graduate Student Travel Funding Policy

The Faculty of Graduate Studies and Research provides some funding assistance to full-time graduate students who are presenting papers at scholarly conferences. Awards usually amounting to one-quarter of transportation costs are made with the expectation that, where possible, similar contributions will be made by one or more of the parent department or school, the faculty dean, the research supervisor, and the student.

Application forms may be obtained from the office of Graduate Studies and must be submitted at least six weeks in advance of the proposed travel to the Dean of the Faculty of Graduate Studies and Research. The application should include the name and location of the conference, the dates of attendance, and a full budget. A letter of support from the supervisor is also required. For further information, please contact the Awards Specialist, Room 1511, Dunton Tower.

Graduate Students' Association (GSA) Excellence Scholarship

Two scholarships are awarded annually to outstanding graduate students in financial need who are not recipients of any other financial assistance, either internal or external to the university. One scholarship, valued at $1,000, is awarded during the Fall term to a returning student registered full-time in either a doctoral program or a master's program. One scholarship, valued at $500, is awarded during the Winter term to a graduate student registered part-time who has completed at least 1.5 credits, or the equivalent, in a graduate program. Information on application procedures and deadlines is available from the GSA Office, 600 Unicentre.

Graduate Students' Association (GSA) Honour Award

Up to four awards are awarded annually to graduate students who demonstrate commitment and dedication to the university community at Carleton, especially with regard to the graduate community. Candidates are nominated by individuals, groups of students or faculty, university committees, departmental student societies and other student groups on campus. Recipients must belong to the GSA. Information on the nomination and selection process is available from the GSA Office, 600 Unicentre.

Graduate Students' Association (GSA) Student-Parent Award

Two awards, valued at $500 each, are available to graduate students in financial need who are parents supporting children. The GSA recognizes that students with families have added financial responsibilities which make higher education less accessible and this award was created to alleviate some of these financial burdens. Information on application procedures and application deadlines is available from the GSA Office, 600 Unicentre.

Rudelle Hall Memorial Scholarship

Endowed in 1995 by family and friends in memory of Rudelle Hall, a graduate of the Master of Arts program, this scholarship is awarded annually, when merited, to a graduate student who is doing work in the area of women's studies. Preference will be given to a female student who is specializing in eco-feminism.

Application is not required. The recipient will be selected by the Dean of the Faculty of Graduate Studies and Research from a list of candidates recommended by the departments, schools, and institutes having graduate programs.

The Michael Hare Fellowship

The fellowship was endowed in 1988 by colleagues, friends, and family in memory of Michael Hare, a graduate of the master's program in geography and former senior proctor in the department.

The fellowship is normally awarded annually to a student in the third or subsequent term of a graduate program in the Department of Geography. It may be held in combination with a teaching or research assistantship. Application is not required; the recipient will be selected by the departmental graduate studies committee. The award is made on the basis of academic achievement combined with a tangible contribution to the quality of the working environment for students in the department.

Ahmed Ali Hashi Human Rights Scholarship

Established to commemorate Ahmed Ali Hashi, an educated, multilingual man with roots in Somalia, the United States and Canada, this fund is made possible by donations from concerned citizens from these three countries who want to promote social justice and the abolition of violence stemming from racial and religious divisions. Ahmed Ali Hashi was killed in a racist attack in Ottawa on March 17, 1999. This crime remains unpunished.

The Ahmed Ali Hashi Human Rights scholarship is given annually to a graduate student in the Human Security and Global Governance cluster at The Norman Paterson School of International Affairs whose interests focus on human rights for minorities and immigrants in any part of the world. Application is not required. The recipient will be selected each year by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the Director of The Norman Paterson School of International Affairs.

Neil Huckvale Memorial Scholarship

This award was established in 1981 by family, friends, and colleagues in honour of Neil Huckvale, a former graduate student in the Department of Geography. The recipient will reflect Neil Huckvale's humanity and philosophy, and will be chosen on the basis of merit and special interest in teaching and resource conservation.

The scholarship will normally be awarded annually to a student enrolled in the third or subsequent term of a graduate program in geography. It may be held in combination with a teaching or research assistantship. Application is not required; the recipient will be selected on the recommendation of the graduate studies committee. If an award is not appropriate in a given year, it will be held over so as to allow more than one recipient in a subsequent year.

The Ina Hutchison Award in Geography
Established in 1989, the fortieth anniversary of the founding of geography at Carleton, this award is presented annually. Its primary purpose is to assist graduate students in geography undertake research, but it may also be used to assist graduate students in the preparation of manuscripts for publication and to facilitate conference participation. The recipient(s) will be chosen each year on the recommendation of a Department of Geography selection committee.

Agnes M. Ireland Bursary
This bursary, valued at $4,800, was established from the Estate of Agnes Mary Ireland. It is awarded to a student who requires financial assistance, has completed an undergraduate degree at Carleton University in either the Faculty of Arts and Social Sciences, the Faculty of Public Affairs and Management or the Faculty of Science, and has enrolled in a graduate program within one year of graduation.

The recipient is chosen each year by the Dean of the Faculty of Graduate Studies and Research from a list of candidates recommended by departmental chairs and school directors. This bursary is open only to permanent residents of Ontario.

Zbigniew A. Jordan Scholarship
This award, established in 1978 by friends and colleagues in honour of the late Professor Zbigniew A. Jordan, is open to all graduate students in sociology.

Application is not required; the recipient will be chosen by the awards committee from candidates recommended by the Department of Sociology and Anthropology on the basis of merit and special interest in sociological theory and the philosophy of social sciences.

Joubin-Selig Bursaries in International Affairs
The Joubin-Selig Bursaries in International Affairs, endowed in 1999 by the estate of Franc R. Joubin and the generosity of his daughter, Marion Selig, are awarded annually to continuing students in the master's program in The Norman Paterson School of International Affairs who need financial assistance in order to complete the program. Applications for the Joubin-Selig Bursaries should be made to the School of International Affairs.

Franc R. Joubin (1911-97) was a well-known Canadian geologist and a member of the Canadian Mining Hall of Fame. He traveled extensively during his career, working for almost 20 years with the United Nations, and had a lifelong interest in international relations and world peace.

The Kalmen Kaplansky Scholarship in Economic and Social Rights
This scholarship in the field of economic and social rights was established in 1998 by the Douglas-Coldwell Foundation to honour the lifetime achievement of labour and human rights advocate Dr. Kalmen Kaplansky.

Awarded annually to a graduate student researching economic and social rights in a School or Department in the Faculty of Public Affairs and Management at Carleton University, the scholarship is valued at $1,000. A detailed letter of application for the award should be made by February 1 to the Dean of Public Affairs and Management, who will select the recipient on the advice of a three-person faculty advisory committee.

The Eve Frankel Kassirer Memorial Scholarship
The Eve Frankel Kassirer Memorial Scholarship is awarded annually, when merited, on the recommendation of the Dean of the Faculty of Graduate Studies and Research, Carleton University, to a graduate student in sociology with research interests relating to ethical issues, the family, or allied health professions. It was endowed in 1988 by family and friends in memory of Eve Kassirer.

Eve was one of the first students to receive a master's degree in sociology from Carleton University.

Eldon Kaye Memorial Scholarship
Awarded annually, on the recommendation of the Chair of the Department of French, to an undergraduate or graduate student in the French program who has demonstrated the most promise in French literature. Endowed in 1989 in memory of Eldon Kaye, who was a professor in the Department of French.

Dr. Roger Kaye Memorial Scholarship
Awarded annually to a deserving graduate student within the Department of Systems and Computer Engineering who is a resident of Ontario and requires financial assistance to continue his/ her studies at Carleton University. Preference is given to students who are undertaking studies in the field of telecommunications, and more specifically in the area of telecommunications network performance or management, of the highest academic level of excellence in collaboration with one or a consortium of Canadian corporations. Endowed in 1997, the donors include colleagues, family and friends in memory and honour of the late Dr. Roger Kaye, Professor of Systems and Communication Engineering.

Sherine Khalil Memorial Bursary in International Affairs

Awarded annually to a deserving full-time student enrolled in the M.A. program in International Affairs who is undertaking work on a thesis related to developmental issues in the Third World, and who is in need of financial assistance in order to complete his/her studies. Endowed in 1990 by friends and family of Sherine Khalil, a graduate student in the Norman Paterson School of International Affairs, who died tragically in the summer of 1990.

The recipient will be selected by the Dean of the Faculty of Graduate Studies and Research from a list of possible candidates submitted each year by the Director of the School of International Affairs.

The John Lyndhurst Kingston Memorial Scholarship

This scholarship was endowed in 1984 by Mrs. Leslie Kingston in memory of her late husband John L. Kingston, Architect. It is awarded annually to an outstanding graduate student studying in a discipline within the Faculties of Arts and Public Affairs and Management, Social Sciences, Science (including Computer Science), or Engineering, whose work is aimed at the betterment of our society.

Application is not required. The recipient will be selected by the Dean of the Faculty of Graduate Studies and Research from a list of candidates recommended by departmental chairs from the above faculties.

Erwin and Herbert Kreyszig Scholarship

This scholarship, valued at $5,000 over one academic year (three terms), is awarded annually, on the recommendation of the Director of the School of Mathematics and Statistics.

The recipient of this scholarship may be eligible for consideration for an Ontario Graduate Scholarship in Science and Technology, which, if it were awarded, would raise the scholarship to $15,000 over three terms.

Students must meet the eligibility requirements for the OGSST in order to qualify for these matched funds. The student must have maintained an overall average of at least A- or equivalent over the last two full years of study at the post-secondary level. The student must also exhibit research ability or potential; excellent communication skills; and interpersonal and leadership abilities.

Established in 2000 by Dr. Erwin Kreyszig and his son Herbert Kreyszig.

Margaret Wade Labarge Graduate Student Research Assistance Fund

Awarded annually to deserving graduate students in the Faculty of Arts and Social Sciences, with preference for students in the humanities. These awards are intended to provide financial assistance to graduate students for the completion of their research when no other source of assistance is available. The recipients will be chosen by the Dean of the Faculty of Graduate Studies and Research. Endowed in 1997 by Dr. Margaret Wade Labarge, C.M.

The Pierre Laberge Research Essay/Thesis Prize for International Affairs

Awarded annually to a student in the Norman Paterson School of International Affairs who writes the best research essay/thesis on a topic that addresses normative or ethical issues in the field of international affairs. The prize is established in honour of the late Pierre Laberge, Professor of Philosophy and former Dean of Graduate Studies and Research at the University of Ottawa, who attended the School in 1989-92. A distinguished Kantian scholar, Professor Laberge's work in recent years focused on the vitally important questions of moral choice and ethics in international affairs. The recipient is chosen on the recommendation of a Norman Paterson School of International Affairs selection committee. The award consists of a sum of money and a book.

Coralie Lalonde Scholarship in Human-Computer Interaction - Ontario Graduate Scholarship in Science and Engineering (OGSST)

Established in 2001 by Ms Coralie Lalonde, this scholarship is awarded annually to a graduate student in either a master's or doctoral program who is conducting research in the area of Human-Computer Interaction (HCI) in the Department of Psychology. Highly qualified students doing research related to human problem solving and decision making, interaction design or evaluation, navigation, or a relevant aspect of e-commerce may be eligible.

The award is valued at $15,000 annually, or $5,000 for each of three consecutive terms.

The recipient must meet the criteria for the Ontario Graduate Scholarship in Science and Technology (OGSST) and will be selected by the Dean of Graduate Studies and Research on the recommendation of the Chair, Department of Psychology. The scholarship may be renewable for a maximum of two years at the master's level and four years at the doctoral level, provided the candidate continues to meet the OGSST criteria as determined by the Faculty of Graduate Studies and Research.

Lambda Foundation for Excellence Award

This bursary, valued at $700 or more as funds become available, is to encourage excellence in research on the subject of gay and lesbian, bisexual and transgendered peoples. The recipients will be announced by the Dean of the Faculty of Graduate Studies and Research based on nominations received from academic units.

Christoph Lehmann-Halens Memorial Award

Awarded annually, when merited, to a student enrolled in the Master of Journalism degree

program at Carleton. While good academic standing is an important consideration, demonstrated interest in the issues of disarmament and/or environmental protection and/or feminist concerns are the main criteria for selection.

The recipient will be chosen each year on the recommendation of the Director of the School of Journalism and Communication.

This award was established in 1987 by Southam News and the family and friends of Christoph Lehmann-Halens, who died tragically while on assignment in Libya.

The Helen Levine Bursary
This bursary may be awarded to one or two students who require special financial assistance in order to complete their studies in social work. Preference will be given to female students who have demonstrated an interest in pursuing research and practice in women's issues or feminist counselling.

The selection of the recipient will be made upon the recommendation of the Director of the School of Social Work.

Endowed in 1990 in honour of retired Professor Helen Levine, recipient of the Governor General's Persons Award for 1989.

Lewar Graduate Scholarship in Arts and Social Sciences
This scholarship was established in 1998 by the Estate of Richard Lewar, a former Commerce student who attended Carleton University from 1974 - 1979, and a long time supporter of the University. To the value of $6,500 over three terms this scholarship is awarded to an outstanding student in the first year of a graduate program in the Faculties of Arts and Social Sciences and Public Affairs and Management. The award may be held for up to two years by a master's student and up to four years by a doctoral student. In the second and subsequent years the amount of the scholarship is $4,000. Continuation of the award is determined by the Awards Committee of the Faculty of Graduate Studies and Research from amongst candidates recommended by the schools and departments of the Faculties.

Lewar-Ontario Graduate Scholarship in Science and Technology (OGSST) - Engineering and Science
This scholarship, established in 1998, is partially funded by the Estate of Richard Lewar, a former Commerce student who attended Carleton University from 1974 - 1979 and a long time supporter of the University, and the Province of Ontario. To the value of $9,000 over three terms, this scholarship is awarded to an outstanding student in the first year of a graduate program in the Faculties of Science and Engineering and Design. The award may be held for up to two years by a master's student and up to four

years by a doctoral student, but for each year nomination is required.

Applicants must be Canadian citizens or landed immigrants and must have an A- average in the last two years of post-secondary education. The award is adjudicated by a committee of the Faculty of Graduate Studies and Research.

R.O. MacFarlane Memorial Award
This award is presented annually to an outstanding student registered in a graduate program in the School of Public Administration at Carleton University. Endowed in 1971 by relatives, friends, and graduates of Carleton University, the award is named in honour of the late R. Oliver MacFarlane, the first director of the School of Public Administration, 1953-1971.

R.A. MacKay Memorial Fund
This fund was established in 1980 by relatives, friends, and former colleagues of the late R.A. MacKay, a distinguished scholar in Canadian government, a senior member of the Department of External Affairs, professor of political science at Carleton University from 1961, and founding associate director of the Norman Paterson School of International Affairs, 1966-68.

The award is intended to assist graduate students from outside Canada who are studying international affairs at Carleton University; they may be enrolled in the Norman Paterson School of International Affairs or come from a related discipline, such as political science, history, or economics, provided that the "international" component of their course of study is prominent.

The Vic Mallet Scholarship
This scholarship commemorates Vic Mallet, an outstanding student of the Department of English, who died tragically in a car accident. Established by the department and by his family and friends, it is awarded annually, when merited, to the student with the highest academic standing on admission to the master's program. Application is not required; the recipient will be chosen on the recommendation of the Department of English.

Manulife Financial Scholarship in Business Journalism
Awarded annually, on the recommendation of the Director of the School of Journalism and Communication, to one or more outstanding graduate or undergraduate students specializing in business journalism. Established in 2000 by Manulife Financial.

Robert and Alyce Martin Scholarship in Journalism
This scholarship was endowed in 1999 by the Estate of Eleanore Roberta Powell and is valued at $9,800. The award is made annually to outstanding students entering the Master of Journalism program. Students will be selected by the Master of Journalism admissions committee.

As a journalist, Mrs. Powell served as a reporter for the Ottawa Citizen during the Second World War. She later joined the women's division of the Royal Canadian Air Force and worked as a public relations officer for the RCAF in Ottawa, Newfoundland and for the RAF HQ in London, England. She moved back to Ottawa after the war with her husband, Leslie C. Powell. The scholarship is named in honour of her parents, Robert and Alyce Martin.

The Dewan Chand and Ratna Devi Marwah Memorial Scholarship in Mathematics and Statistics

This scholarship, valued at $1,000, was endowed in 1984 by Professor Kanta Marwah of the Department of Economics in honour and memory of her parents. It will be awarded annually to the most outstanding and deserving graduate student within the Department of Mathematics and Statistics, preferably to a doctoral candidate who, having successfully completed all course and comprehensive requirements, is undertaking completion of a dissertation.

No application is required. The recipient will be selected by the Scholarship Committee, composed of the Chair of the Department of Mathematics and Statistics, the Director of the Ottawa-Carleton Institute of Mathematics and Statistics, and Professor Kanta Marwah or her designate. The recipient of the award will be announced by the Dean of the Faculty of Graduate Studies and Research in September each year. In a given year, the award may not be made for lack of a suitable candidate.

P.D. McCormack Fund

The purpose of the fund is to establish a memorial in perpetuity to Peter D. McCormack. The P.D. McCormack Fund is to be used for the support of graduate students in general experimental psychology in the Department of Psychology. Support may be direct (e.g., scholarships) or indirect (e.g., support of a graduate student reading room). The Chair of the Department of Psychology shall determine the deployment of funds on an annual basis.

The P.D. McCormack scholarships should be considered as prestige awards in a manner similar to the Epstein Fellowships. The Dean of the Faculty of Graduate Studies and Research, in collaboration with the Chair of the Department of Psychology, will determine the number and amount of the awards in January of each year to be awarded in the following fall.

The Bruce McFarlane Bursary

In honour of Dr. Bruce McFarlane and in recognition of his outstanding contributions during 33 years as a teacher and a scholar at Carleton University. On the occasion of his retirement in 1992, Dr. McFarlane's friends, colleagues and former students established this bursary. The Bruce McFarlane Bursary is available to full-time graduate students from the Department of Sociology and Anthropology or the Norman Paterson School of International Affairs who need financial assistance in order to meet tuition fees or cover research costs. Application is not required. The recipient(s) will be selected each year by the Dean of the Faculty of Graduate Studies and Research from candidates recommended by the above units.

Violet McLaughlin Scholarship

This scholarship, which carries a value of up to $1,000, was established in 1984 and is derived from a legacy of the late Violet McLaughlin to graduate students in the School of Social Work.

Two scholarships will normally be awarded each year: one to a graduate student who, upon admission, possesses the highest academic standing; and one to a student achieving the highest academic standing at the end of the first year of the program.

Application is not required; the recipients will be chosen by the awards committee from candidates recommended by the School of Social Work.

The Stanley Mealing Bursary

Established in 1990 by former students, friends, and colleagues of Professor Stanley Mealing on the occasion of his retirement, this bursary is available to full-time master's or Ph.D. students in history who require financial assistance in order to continue their studies at Carleton University.

Applications should be made to the Chair of the Department of History. The selection of the recipient(s) each year will be made upon the recommendation of a selection committee comprised of the Department of History graduate committee.

The Millennium Gold Corporation Bursaries

Endowed by the Millennium Gold Corporation in 1999, these bursaries are awarded annually to one or more deserving graduate students in Earth Sciences who require financial assistance in order to attend, or continue studies at Carleton University. Preference to be given to students with an expressed interest in field, exploration and mining geography.

These bursaries are open only to permanent residents of Ontario, and will be awarded on the recommendation of the Chair of the Department of Earth Sciences, College of Natural Sciences.

Chet Mitchell Memorial Award in Law

Established in 1991 by colleagues, family, and friends in honour of the late Chet Mitchell, who was a professor in the Department of Law, this award is given annually to a deserving student enrolled in the Master of Arts program in legal studies.

Application is not required. The recipient will be chosen each year on the recommendation of the Chair of the Department of Law.

Molecular Recognition and Inclusion Scholarship

Endowed in 1995 by the organizing committee of the 8th International Symposium on Molecular Recognition and Inclusion, this scholarship will be awarded annually to an outstanding student entering a graduate program in the Ottawa-Carleton Chemistry Institute. The scholarship will be used to encourage young researchers to enter the field of Molecular Recognition and Inclusion. Application is not required. The name of the recipient will be announced by the Dean of the Faculty of Graduate Studies and Research, on the recommendation of the Director of the Ottawa-Carleton Chemistry Institute.

Roy Buckley Morrison Scholarship

This scholarship was established in 1979 in honour of the late Roy Buckley Morrison by Panasonic/ Matsushita Electric of Canada Limited, and friends and associates. It will normally be awarded to a Canadian citizen or permanent resident of Canada registered in the Norman Paterson School of International Affairs.

Application is not required; the recipient will be chosen by the awards committee from candidates recommended by the School on the basis of merit and special interest in conflict analysis and/or studies in strategy and security.

George Mulligan Memorial Scholarship

Established in 1989 by colleagues and friends of the late George Mulligan, who was a partner of Toronto Investment Management Inc., this scholarship is awarded annually, when merited, to a deserving student enrolled in the Master of Business Administration program to assist in the undertaking of research for a thesis dealing with investment management.

Application is not required. The recipient will be selected on the recommendation of the Director of the School of Business. In a given year, the award may not be made for lack of a suitable candidate, but will be held over so as to allow more than one recipient in a subsequent year.

Norman Paterson School of International Affairs Alumni Association Foreign Student Bursary

Endowed by the alumni of the Norman Paterson School of International Affairs (NPSIA) in 1990, this bursary is awarded annually to one or more foreign students, admitted full time in the M.A. program in International Affairs, who require(s) financial assistance in order to study at Carleton University.

The recipient will be chosen by a selection committee composed of the Director of the School of International Affairs, two representatives from the NPSIA Alumni Association, and one other faculty member from the School of International Affairs. The name of the recipient will be announced by the Dean of the Faculty of Graduate Studies and Research.

Interested applicants should contact the Director of the School of International Affairs. The bursary may not be awarded if there is no qualified candidate. In such cases it will be held over so as to allow more than one recipient in a subsequent year.

Nortel Networks Graduate Scholarships

Established in 1999 by Nortel Networks, up to 10 scholarships each valued at $10,000 over three terms will be awarded to outstanding graduate students at either the master's or the doctoral level in Computer Science, Electronics and Systems and Computer Engineering who show outstanding research potential. The scholarships are renewable and may be held for up to two years for master's students and up to four years for doctoral students.

Maureen O'Neil Award in Women's Studies

This award was endowed in 1985 by Canadian Hadassah-WIZO in honour of Maureen O'Neil, Coordinator, Status of Women Canada. It is awarded annually, when merited, to a student enrolled in the Faculty of Graduate Studies and Research who is doing work in the area of women's studies.

Application is not required. The recipient will be selected by the Dean of the Faculty of Graduate Studies and Research from a list of candidates recommended by each department within the Faculties of Arts or Social Sciences.

Robert E. Osborne Award

Awarded annually, on the recommendation of the Chair of the Department of Religion, to an undergraduate or graduate student in the religion program. Preference, in order, will be given in the areas of New Testament, biblical, and other forms of religious studies. Endowed in 1986 in memory of Robert E. Osborne who was a professor in the Department of Religion.

Khayyam Zev Paltiel Doctoral Dissertation Prize in Social Philosophy, Social Theory, or Social Policy

This prize, endowed by Professor Khayyam Z. Paltiel of the Department of Political Science, is intended to provide a fund to assist in the publication of a deserving doctoral dissertation presented to the Faculty of Graduate Studies and Research at Carleton University in the fields of social philosophy, social theory, or social policy. The prize is awarded biennially to the best doctoral dissertation presented in these fields in the previous two-year period. The prize is not intended to be confined to students in a particular discipline; doctoral dissertations in the appropriate fields may be presented in political science, sociology and anthropology, economics, psychology, and history. Dissertations are nominated for the prize by the doctoral examining boards; adjudication is by a committee chaired by the Dean of the Faculty of Graduate Studies and Research and including the appropriate faculty deans together with the chairs of the relevant departments.

Paterson Fellowships

From the generous support provided by the late Senator Norman M. Paterson when the School was established in 1966, funds are allocated to support some candidates for the M.A. degree in the Norman Paterson School of International Affairs.

All those with high standing who are admitted to this program are considered for these fellowships.

Lester B. Pearson Scholarships

These scholarships, which were established in 1990 by a bequest from the estate of the late Lester B. Pearson, will be awarded after the first term of each academic year to three graduate students working in the areas of Canadian foreign policy, politics, or history. The awards, having a value of approximately $1,000 each, will be made on the recommendations of the Director of the School of International Affairs and the Chairs of the Departments of Political Science and History.

The Wilfred Peltier Memorial Scholarship in English

Awarded annually on the recommendation of the Chair of the Department of English, to a student whose area of interest is Aboriginal Literature. This award was established in 2001 by family, friends and colleagues of Wilfred Peltier, Odawa pipecarrier, who passed away in July, 2000. Associated some 20 years with Carleton University, Peltier served as an Elder-in-Residence in the Department of Sociology/Anthropology as well as adviser to the Centre for Aboriginal Education, Research and Culture.

Guardian of Anishnaabe traditions, renowned storyteller, and author of *No Foreign Land* and *A Wiseman Speaks*, Peltier guest-lectured over the years in a number of departments, including English and Psychology. He had a loyal following of faculty and students who regularly dropped in to chat and hear his words of wisdom.

The Norman Pollock Memorial Award for Latin American Studies

This award is presented annually to an outstanding student in the areas of Canadian-Latin American relations or Latin American development studies. It has been endowed to honour the memory of Norman Pollock by his son David H. Pollock and his granddaughter Susan A. Harkavy.

Application is not required. The recipient will be selected by the Dean of the Faculty of Graduate Studies and Research from candidates nominated from relevant graduate programs.

John Porter Graduate Bursary

An annual bursary of $1,000 awarded to an M.A. student in sociology who requires financial assistance in order to complete studies at Carleton University. The selection of the recipient

will be on recommendation of the Coordinator of Graduate Studies, Department of Sociology and Anthropology.

Pratt & Whitney Canada Graduate Scholarship

Established in 1996, this scholarship is valued at $2,000. It is awarded annually, when merited, to a student entering the Master of Engineering program in Mechanical and Aerospace Engineering specializing in gas turbine technology. Application is not required. The recipient will be selected by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the Chair of the Department of Mechanical and Aerospace Engineering.

Tim Ralfe Memorial Scholarship in Journalism

Awarded annually on the recommendation of the Director of the School of Journalism and Communication to an outstanding student who is proceeding from the first to second year in the Master's of Journalism program. Preference will be given to students who show great promise as a future journalist, and a demonstrated interest in the field of Canadian public/political affairs. Endowed in 2001 by family, friends and colleagues of Tim Ralfe. The scholarship was established in memory of Tim Ralfe to recognize his illustrious career and the outstanding contribution he made to the field of journalism.

Residence Fellowships

Applications are invited from graduate and senior undergraduate students with good academic standing. The Residence Fellowship responsibilities include supervision of a floor in residence, enforcement of community regulations, and counseling of students in residence. An excess of twenty hours per week is required to meet job responsibilities satisfactorily. Please note that the selection process demands that candidates attend an interview and a workshop in the second term.

Application forms may be obtained from the office of Housing and Food Services, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, K1S 5B6. The deadline for receipt of applications is January 18.

Rogers Communications Award in Mass Communication

Awarded annually to an outstanding student enrolled in the Master of Arts in Communication program. The recipient will be selected by the awards committee of the Mass Communication Program. Endowed in 1991 by Rogers Ottawa Ltd.

Rogers Communications Award in Television Journalism

Awarded annually on the recommendation of the School of Journalism and Communication to the student graduating from the Master of Journalism program who shows the most promise

as a television journalist. Endowed in 1991 by Rogers Ottawa Ltd.

The Roderick S.J. Rooney, F.C.A. Memorial Scholarship

This scholarship was endowed in 1985 by Mrs. Isabella M. Rooney in memory of her late husband Roderick S.J. Rooney, F.C.A. It is awarded annually to an outstanding student who is enrolled in the Master of Social Work program.

Application is not required. The selection of the recipient will be decided on the recommendation of the Director of the School of Social Work.

William and Margaret Roxburgh Memorial Award

This award was established in 1981 by Ross Roxburgh, and is open to all graduate students in the School of Canadian Studies. The amount of $250 is provided annually to assist students in carrying out research projects.

Application should be made to the Director of the School of Canadian Studies; recipients will be chosen from a list of candidates recommended by the Director.

John Ruptash Memorial Fellowship

This fellowship was established in 1974 by relatives, former students, faculty colleagues, and friends as a memorial to the late John Ruptash, who was Dean of the Faculty of Engineering and later Dean of the Faculty of Graduate Studies and Research from 1959 to 1973. The fellowship has been awarded annually, beginning in 1975-76, to an outstanding graduate student in the Faculty of Engineering; it may be held in combination with a teaching or research assistantship.

Application is not required; the recipient will be chosen by the awards committee of the Faculty of Engineering.

School of Social Work 50th Anniversary Bursary

Established in 1999 by alumni, faculty and staff in recognition of the 50th anniversary of the School of Social Work, this bursary is awarded annually to students in the School of Social Work who require financial assistance to continue their studies. The recipients are chosen by the Director of the School of Social Work.

Imam Tawfiq Shaheen Memorial Scholarship

This scholarship was established in 1998 by the Ottawa Muslim Association in memory of the late Dr. Tawfiq Shaheen who was the imam of the Ottawa Mosque from 1980-1997. It is awarded annually, when merited, on the recommendation of the Dean of the Faculty of Arts and Social Sciences, to a full-time student enrolled in an undergraduate or graduate program who undertakes a research project embracing, among other Islamic subjects, Islamic religion, Islamic jurisprudence, Islamic art, Islamic history, Islamic culture, Islamic ethics or Islamic philosophy.

Shannon Scholarships in Canadian Social History

Established in 2000 by an anonymous donor, these scholarships are awarded on the recommendation of a selection committee, composed of the chair of the Department of History and two other faculty members, chosen by the chair, to outstanding graduate and/or undergraduate students studying full-time in the field of Canadian social history, immigration, migration or local history, with preference to those with research interests in British and Irish immigration to Canada or the local history of eastern Ontario and western Quebec.

The Arnold Smith Award in International Affairs

Valued at $1,500, this award was established in 1990 by the North-South Institute in honour of the outstanding contribution made to the Institute by its Chair of the Board, Mr. Arnold Smith. It is awarded annually, when merited, to a student who is enrolled full-time in the Master of Arts program in international affairs, is following the development studies core, and whose work focuses on Canadian policies toward developing countries in aid, trade, or international finance. Application is not required. The recipient will be selected each year by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the Director of the School of International Affairs.

The Arnold Smith Commonwealth Scholarship

This scholarship will be awarded annually from funds provided by the Royal Commonwealth Society, Ottawa Branch, to a student from a Commonwealth country other than Canada in any field of study at the graduate level. The award will be based on academic excellence and seeks to recognize students who will use their studies to contribute to the development of their country of origin.

Application is not required. The recipient will be chosen by the awards committee of the Faculty of Graduate Studies and Research from a list of candidates recommended by each department.

Social Sciences Graduate Bursary

This fund is made possible by contributions from staff and faculty employees in the social sciences. Support of up to $100 is available to graduate students nearing the completion of their program and experiencing financial difficulty in meeting the costs of typing/reproduction of an M.A. or Ph.D. thesis.

Application should be made to the chair/director of the student's department, for referral with recommendation to the Dean of Arts and Social Sciences or the Dean of Public Affairs and Management, where applicable.

Nicholas P. Spanos Memorial Award in Psychology

This award, established in memory of Professor Nick Spanos, a faculty member at Carleton University from 1975 to 1994, is presented to graduate students in the Department of Psychology who have shown exceptional research achievement. The award is supported by the generosity of the family and friends of Professor Spanos.

Professor Spanos was a prolific researcher in the areas of hypnosis, multiple personality disorders, spousal abuse, ritualistic behaviours, false memory syndrome, imagery, absorption, and other topics too numerous to list. Journal citations placed Professor Spanos as a leading world publisher in social psychology. He was a proud mentor for many graduate and undergraduate students in his years at Carleton.

Application is not required. Four awards, valued at approximately $100 each, are presented each year to students in the Department of Psychology on the recommendation of the Graduate Committee of the Department of Psychology.

Special Bursary for Students in Social Work

This bursary, in the amount of $1,000 annually, may be awarded to one, or divided between two students in the School of Social Work who require special financial assistance in order to complete their studies at Carleton University. The selection of the recipient(s) will be decided on the recommendation of the Director of the School of Social Work.

The Frank Stone Memorial Prize

Awarded annually, when merited, to a student graduating from the M.A. program in international affairs who presents the best thesis or research essay on Canadian trade policy. Endowed in 1990 by friends and colleagues of the late Frank Stone in honour of his contribution to the study of trade policy in Canada and to encourage others to follow in his footsteps.

Application is not required. The selection of the recipient will be decided on the recommendation of the Director of the School of International Affairs, and the winner will be announced each year by the Dean of the Faculty of Graduate Studies and Research.

Colonel William B. Sutherland Bursary

Awarded annually on the recommendation of the Director of the School of Canadian Studies, to a Canadian Studies graduate student who demonstrates the need for financial assistance in order to excel in their studies. Preference is given to students enrolled in the Cultural Studies or Aboriginal Studies and the North program areas. Endowed in 2000 by the Sutherland family in tribute to the passion for the pursuit of knowledge that Colonel Sutherland has exemplified in all aspects of life. The award is intended to provide support for students who share this spirit.

Maxwell Taylor Scholarship

This scholarship, which was endowed in 1998 by a bequest from the estate of the late Mabel Leona Taylor, is awarded annually to a student in his/her final year of the master's program in Architecture who incorporates building technologies into his/her thesis project. The recipient will be chosen by the Director of the School of Architecture.

Michael Thompson Scholarship in English

Awarded annually, on the recommendation of the Chair of the Department of English Language and Literature, to the English Honours student with the highest GPA who is proceeding from third to fourth year of the Honours program, or from fourth year to Carleton's Master of Arts program in English. Endowed in 1992 by colleagues, friends, and former students in honour of Professor Michael Thompson's many contributions to the Department and to the University.

The Torrance Research Scholarship in Geography and Environmental Studies

Endowed in 2001 by J. Kenneth and Margaret Torrance, this scholarship is awarded annually. Its purpose is to support field research and/or conference presentations by graduate students in geography and environmental studies. Application is required and must be accompanied by a research proposal or the abstract of the paper to be presented. All applications must be received no later than March 1. Recipient(s) will be chosen by a Department of Geography and Environmental Studies selection committee. Further details of application procedures may be obtained from the Graduate Secretary.

Philip E. Uren Fellowships

Two fellowships are awarded annually, one to a graduate student in the Department of Geography and one to a graduate student in the Norman Paterson School of International Affairs, and may be held in combination with a teaching or research assistantship. Application is not required; the recipient will be chosen by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the awards committees from the academic units involved. The fellowships were established in 1980 by relatives, friends, former students, and faculty and staff colleagues as a memorial to the late Philip Ernest Uren who was a professor of geography between 1965 and 1979, and who served the University as Chair of the Department of Geography, Director of the Institute of Soviet and East European Studies, Director of the Norman Paterson School of International Affairs, and Director of the Paterson Centre for International Programs.

Frank Vallee Scholarship in Anthropology

This scholarship was established in 1999 by family and friends of Dr. Frank Vallee, a respected professor of social anthropology and former chair of the Department of Sociology and Anthropology at Carleton University. This

$1,000 scholarship is awarded to a deserving graduate student who area of research is anthropology. Preference is given to students of Aboriginal ancestry.

Applications are not required. The recipient will be chosen by the awards committee of the Faculty of Graduate Studies and Research from a list of candidates submitted by the Chair of the Department of Sociology and Anthropology.

The Varian Graduate Scholarship in Analytical/Environmental Chemistry

This Scholarship was established in 1992 by Varian Canada in recognition of its involvement in the development of the Centre for Analytical and Environmental Chemistry, in the Department of Chemistry. Valued at $2,000, this scholarship is awarded annually to an outstanding graduate student who is carrying out research in the Centre for Analytical and Environmental Chemistry. Application is not required; the recipient will be announced by the Dean of the Faculty of Graduate Studies and Research based on recommendation from the Department of Chemistry.

Norma E. Walmsley Award for International Understanding

Valued at $2,500, this award, established in 1955 by MATCH International Centre, is to honour Dr. Norma E. Walmsley, O.C., the organization's Founding President, for distinguished service to Canada and for her outstanding contribution to the international community through university teaching and imaginative leadership in governmental and non-governmental agencies.

It is awarded annually, when merited, to a student or students who is/are enrolled full-time in the Master of Arts program in International Affairs and whose work will further international understanding between Canadian women and women of Africa, Asia, the Caribbean and Latin America.

Application is not required. The recipient will be selected each year by the Dean of the Faculty of Graduate Studies and Research on the recommendation of the Director of the School of International Affairs.

Gabriel Warshaw Memorial Scholarship

Established in 1998 in honour and memory of Dr. Gabriel David Warshaw. Dr. Warshaw received his Master of Engineering and Doctor of Philosophy degrees at Carleton University and was active in the Canadian and international space programs as a partner of Routes, Inc., Ottawa, until his untimely passing in 1998.

Valued at $1,000, this scholarship is awarded annually to an outstanding graduate student in either the Department of Systems and Computer Engineering or Mechanical and Aerospace Engineering, aspiring to a career based on the peaceful and environmentally respectful applications of these disciplines. The recipient will be selected by a committee comprised of the Dean of the Faculty of Graduate Studies and Research and a representative of the donors from candidates recommended by the Chairs of these departments. It may not be awarded in a given year for lack of a suitable candidate.

Charlotte Whitton Fellowships in Canadian Urban Life

In honour of the distinguished contribution of the late Charlotte Whitton to Canadian urban life and politics, and her long association with Ottawa, up to two fellowships in urban life will be awarded annually to the student(s) in the School of Canadian Studies with the highest standing on admission. The proposed field(s) of study must relate to urban life and problems.

The recipient(s) will be chosen by the Dean of the Faculty of Graduate Studies and Research on the advice of the Director of the School of Canadian Studies.

Alice E. Wilson, F.R.S.C. Scholarship in Geoscience

This scholarship, valued at $1,000, was established in 1995 by the Canadian Federation of University Women/Ottawa. The scholarship is in honour of Alice E. Wilson, F.R.S.C., a paleontologist with the Geological Survey of Canada, and a charter member of the Canadian Federation of University Women/Ottawa when it was founded in 1910.

It is awarded annually, when merited, to a graduate student enrolled in the Ottawa-Carleton Geoscience Centre. Application is not required. The recipient will be selected on the recommendation of the Director of the Centre. Preference will be given to students who are returning to studies after absences due to family responsibilities.

The S.F. Wise Graduate Bursary

Established in honour of a former Dean of the Faculty of Graduate Studies and Research, the bursary is awarded annually to an outstanding graduate student registered in the thesis portion of a doctoral program in the Humanities (History, Literary Studies, Linguistics and Applied Language Studies, Studies in Art and Culture, and Canadian Studies) who requires financial assistance in the final stages of the program. If no suitable doctoral candidate is forthcoming, the bursary may be awarded to a student registered in a thesis-based master's program in the same disciplines.

The recipient is chosen each year by the Dean of the Faculty of Graduate Studies and Research from a list of candidates recommended by departmental chairs and school directors. This bursary is open only to permanent residents of Ontario.

David and Rebecca Zelikovitz Scholarship
Endowed in 1991 through a bequest from the estate of the late David Zelikovitz, this scholarship is awarded annually to a deserving graduate student who is studying Jewish culture.

Application is not required. The recipient will be selected by the Dean of Graduate Studies and Research from among those candidates recommended each year by departments, schools and institutes having graduate programs.

Awards Tenable at Carleton University

In addition to the scholarships listed below provided by the Province of Ontario (OGS, OGSST) or national granting councils such as SSHRC and NSERC, a large number of foundations, companies, fraternal organizations, and other agencies offer generous fellowships and scholarships in a wide range of fields.

These awards include such provincial scholarships as the Sir. John A. Macdonald Graduate Fellowship in Canadian History, federal scholarships such as the Department of Defence Scholarships and Fellowships, as well as such external scholarships as the I.O.D.E. War Memorial Scholarships for Doctoral Study, Fulbright Scholarships and The Rhodes Scholarship, among others. Students are urged to obtain information on these funding opportunities by consulting External Awards on the Faculty of Graduate Studies and Research Web site at www.gs.carleton.ca. These awards are not administered by the Faculty of Graduate Studies and Research in any way and it is the responsibility of each student to contact the agency directly to obtain application forms and procedures.

Commonwealth Scholarship Plan
The Government of Canada, through the Commonwealth Scholarships and Fellowships Committee, offers annually a number of scholarships and fellowships to Canadian citizens in certain Commonwealth countries.

The deadline for receipt of applications varies depending on the destination country selected. Some Commonwealth countries have a deadline of October 4th, however Fiji and New Zealand, for example, have a deadline of December 21. The value of the award as well as additional costs covered also varies.

For further details, please contact the International Council for Canadian Studies/Conseil International d'études canadiennes (ICCS) 75 Albert Street, Suite #908, Ottawa, Ontario, K1P 5E7, telephone 789-7828, or check their Web site at: www.scholarships-bourses-ca.org · Application forms are also available from Carleton International, Room 1505 Dunton Tower.

Natural Sciences and Engineering Research Council (NSERC)
NSERC Postgraduate Scholarships (range $17, 300 - $19,100 a year) are tenable at Carleton University by students undertaking advanced graduate studies and research in science, engineering, experimental psychology, and physical geography.

Students currently enrolled at Carleton University must apply through their departments on prescribed forms available from the office of the Faculty of Graduate Studies and Research or online at the Council's Web site at www.nserc.ca. The internal university deadlines are well in advance of the Council's deadline and students are advised to contact their individual department. Candidates are also advised to consult the Web site for all relevant details concerning eligibility and application procedures and requirements.

Natural Sciences and Engineering Research Council of Canada (NSERC) - Industrial Postgraduate Scholarships
The Industrial Postgraduate Scholarship (IPS) valued at $19, 300 annually is offered by the Natural Sciences and Engineering Research Council of Canada (NSERC). The IPS is tenable at Carleton by students pursuing either full-time or part-time graduate studies in the natural sciences or engineering, experimental psychology or physical geography. NSERC contributes $13,800 per year and the remaining $5,500 per year is contributed by an approved, industrial partner. The term of the award is two years.

There is no deadline for this scholarship. Applications can be submitted at any time.

Candidates must apply using the prescribed forms available on the NSERC Web site at www.nserc.ca. For more information, contact the Awards Specialist in the Faculty of Graduate Studies and Research, Room 1511 Dunton Tower.

Ontario Graduate Scholarships (OGS)
The Province of Ontario annually offers scholarships of $5,000 per term (for two or three consecutive terms) to students who intend to pursue graduate studies at an Ontario University. Applicants entering the first or second year of graduate studies at the time of application are eligible if they have an average of at least A-, or the equivalent, on the last 20 one-term/semester courses, or the equivalent, completed. Applicants entering the third year or beyond of graduate studies at the time of application are eligible if they have an average of at least A-, or the equivalent, on all graduate courses completed. Application forms and brochures containing details of the award may be obtained from the student's department or online at the Ministry of Training, Colleges and Universities Web site at osap.gov.on.ca/eng/not_secure/OGS.htm. Registered students should submit completed application forms to their department. The internal university deadline is well in advance of the

published deadline set by the Ministry, and students are advised to contact their department for more information on application deadlines and procedures.

Ontario Graduate Scholarships in Science and Technology (OGSST)

Established in 1999 by the Province of Ontario, this scholarship is awarded annually to students in science and technology disciplines including the applied sciences, biological and life sciences, and physical sciences. The maximum value of the award is $15,000 per annum or $5,000 per term, of which one third is contributed by the private sector and two thirds by the Province of Ontario. There is no application procedure. Candidates must be nominated by departments/institutes/schools and must be Canadian citizens or permanent residents, meet the academic requirements of the Ontario Graduate Scholarship and exhibit research ability or potential, excellent communication skills and interpersonal and leadership qualities. For more information on the terms of the award as well as the disciplines covered, please consult the Faculty of Graduate Studies and Research Web site at www.gs.carleton.ca

Social Sciences and Humanities Research Council of Canada (SSHRC)

The Council offers fellowships ranging in value up to $17,700 per year, for up to four years, for studies and research at the doctoral level in the humanities and social sciences. These fellowships are tenable in Canada or abroad for a minimum of six months and a maximum of 48 months.

The Guide to Applicants and application forms for the doctoral fellowship program are available on the Council's Web site at: www.sshrc.ca. The internal deadline for receipt of applications is well in advance of the deadline published by the Council and students are urged to contact their department or the Awards Specialist, Faculty of Graduate Studies and Research, Room 1511 Dunton Tower for details and more information.

Government Aid Programs

Ontario Residents

Canadian citizens or landed immigrants (permanent residents) who are residents of Ontario may qualify for assistance from the Ontario Student Assistance Program. The financial aid scheme is designed to supplement, rather than replace, family and/or student resources. In order to determine the additional funds required, the province objectively assesses the resources that could reasonably be used to provide for the student's educational costs. Interest-free Canada Student Loans and/or Ontario Student Loans are given to assist the student. The maximum loan a student can receive in one academic year is usually the total amount of his or her allowable educational costs. Application forms and further information

can be obtained by contacting the Awards office at Carleton or the Student Awards Branch of the Ministry of Education and Training, Fellowship Section, P.O. Box 4500, 189 Red River Road, 4th Floor, Thunder Bay, Ontario, P7B 6G9.

Students wishing to have applications processed in time for fall registration must ensure that completed forms are submitted to the Awards office by July 1.

Residents of Other Provinces/ Territories Except Quebec

Canadian citizens or landed immigrants (permanent residents) from the territories and all other provinces except Quebec may qualify for assistance from the Canada Student Loans Plan through their home province. The loan is interest free while the student is enrolled full time. Some provinces also make available non-repayable grant assistance along with this federal loan.

The Awards office disburses general information on the various provincial aid schemes, but application forms and details on individual programs must be obtained from the authorities in the home province. Deadline dates vary but, generally speaking, it is wise to apply for financial assistance through the appropriate provincial department before June 30.

Quebec Aid

Applications from students for assistance from the province of Quebec should be made directly to the Awards office. Deadline dates for submission of applications are May 31 for all students who submitted an application for the previous school year and June 30 for all students who did not submit an application for the previous school year. In order to be accepted by the Department of Education, all applications must be coded by the Awards office.

The above government assistance programs are subject to change.

University Loan Funds

John Parker Loan Fund

This fund was established to provide loans of up to $1,000 to students in their first year of studies at Carleton University, and up to $1,500 in future years to students who require financial assistance to meet their educational costs. This fund also provides emergency loans for 60 days or less to students whose funds from other sources have been delayed. Application forms are available to students in the Awards Office, Room 202, Robertson Hall, telephone (613) 520-3600.

General Regulations

- Academic Standing
- Administration of the Regulations
- Admission Procedures
- Admission Requirements and Eligibility
- Appeals and Petitions
- Application for Admission
- Continuous Registration
- Engineering Regulations
- Examinations
- Grading System
- Graduation
- Instructional Offences
- Offences of Conduct
- Program Requirements
- Registration and Course Selection
- Thesis Requirements
- Time Limits for Program Completion
- Transfer of Credit

General Regulations

1. Administration of the Regulations

1.1 General Administration

The regulations on the following pages apply to all degree, diploma and certificate programs administered by the Faculty of Graduate Studies and Research.

1.2 Student Responsibility

(i) The student is responsible for knowing the regulations of the Faculty of Graduate Studies and Research and for complying with them. Any exceptions to the regulations must be approved, in writing, by the Dean of the Faculty of Graduate Studies and Research. Routine approval of a records form does not constitute approval of an exception.

It is also each student's responsibility to establish and maintain contact with his or her faculty adviser or thesis supervisor.

(ii) In order for a student to receive his or her degree, he or she must fulfil:

- all the requirements of the department, school, or institute in which he or she is taking the degree;

- all faculty regulations;

- all University regulations;

- all financial obligations to the University.

2. Admission Requirements and Eligibility

2.1 General Requirements

Graduates of recognized universities will be considered for admission to the Faculty of Graduate Studies and Research. The University's general policy on admission is outlined below, but all applicants should refer to the departmental statements in this Calendar for details concerning the specific or additional requirements of each department, institute, or school.

2.2 Eligibility

A combination of factors is taken into consideration in assessing the eligibility of a candidate for admission into one of the graduate programs:

- the performance of the candidate and the assessment provided by his/her referees as a measure of the likelihood that the candidate can successfully complete the course of studies and research defined by the Senate of the University for the given degree

- the capacity of the graduate department, institute, or school to provide a program of studies and research which would meet the expectations of the candidate as defined in his/her statement of academic interests and ambitions

- the availability of a faculty member competent to supervise the academic program of studies and research of the candidate at the time.

2.3 Qualifying-Year Program

Applicants who do not qualify for direct admission to the master's program may be admitted to a qualifying-year program. Applicants who lack an Honours degree but have a 3 year degree with honours standing (at least B overall) will normally be admitted to a qualifying-year program.

If successful in this qualifying year and upon formal application to the Faculty of Graduate Studies and Research, the student may eventually proceed to the master's program. However, admission to the qualifying-year program does not imply automatic admission to the master's program. At the end of the qualifying-year program the student will be required to apply for entry into the master's program, at which time the department will determine the student's eligibility to enter the program. If successful, the student will be informed of this decision by the Dean of the Faculty of Graduate Studies and Research.

Applicants for a master's degree who have a program requirement of 7.5 credits or more (with the exception of the School of Public Administration and the School of Journalism and Communication) will register initially in the qualifying-year program.

Credits taken to fulfil the requirements of the qualifying-year program may not be used for credit for the master's degree. Courses taken extra to the program requirements of the qualifying year and which have been successfully completed may be considered for credit towards the master's degree.

2.4 Master's Program

For admission to the master's program, applicants must hold an Honours bachelor's degree, or the equivalent, with at least high honours standing (normally B+ or better in honours subject; B- or better overall). The applicant must also be recommended by the department in which he/she plans to undertake his/her studies.

Applicants for a master's degree who have a program requirement for 7.0 credits or less will register directly in the master's program.

2.5 Doctoral Program

For admission to the Ph.D. program, applicants must ordinarily hold a master's degree, or the equivalent, from a recognized university, normally with an average of B+ or better in courses (including thesis where applicable) and normally with no grade below B-.

2.6 Restriction on Degrees

Applicants should note that, while Carleton University does not restrict the number of degrees (bachelor's, master's, Ph.D.) that may be taken in any one discipline, some departments and schools may restrict the number to two.

2.7 Certificate Programs

For admission to the certificate programs, applicants are advised to consult with the individual departments offering the certificate.

3. Application for Admission

3.1 Accommodation Policy for Students with Disabilities

Carleton University has a Senate-approved policy on academic accommodation for students with disabilities. For more information, consult the Paul Menton Centre for Students with Disabilities entry in the Student Services section of this Calendar.

3.2 Application Forms

Applications for admission to the Faculty of Graduate Studies and Research should be made on prescribed forms, available from the major department or the office of the Faculty of Graduate Studies and Research, and they should be submitted directly to the department. To cover administrative costs, a non-refundable charge of $35 (Cdn. or U.S. funds) is required with each application.

3.3 Deadlines

The Faculty of Graduate Studies and Research normally admits students to commence in the fall term. However, some academic units may consider applicants to commence in the winter term or the spring/summer term. Applications for admission may be submitted at any time. Applications for admission from outside Canada should be completed at least five months before the desired date of admission in order for students to make the necessary visa arrangements.

Applicants wishing to be considered for financial assistance from Carleton University are reminded that they must submit their completed applications before March 1. Please note that some schools and departments may require

completed applications prior to March 1. Students should refer to departmental entries in this Calendar for details.

Students applying to joint programs with the University of Ottawa should note that application procedures, especially deadlines, are different in the two institutions, and they should refer to the university calendars for details.

3.4 Transcripts

Two detailed official transcripts of the applicant's entire university record must be sent to the chair of the department concerned. All foreign documents, e.g., transcripts, must be translated into English and be notarized.

3.5 Letters of Reference

All applications must be supported by letters of recommendation from at least two faculty members with whom the candidate has studied, who are in a position to assess his/her potential for graduate studies and research. References from non-academic supervisors are not ordinarily acceptable, except in certain cases, such as that of an applicant working in a research laboratory environment. All letters of reference are to be sent by the referees directly to the chair of the department.

3.6 Proficiency in English

Proficiency in English is necessary to pursue graduate studies at Carleton University. All applicants whose first language is not English must satisfy this requirement in one of the following ways:

(i) certification that the language of instruction in their most recently completed undergraduate or graduate degree was English; or

(ii) an overall score of 60 or better on the Canadian Academic English Language Assessment with a minimum score of 60 for the writing section (some programs may require a higher standard of performance); or

(iii) a TOEFL score of 550 or better (some programs may require a higher standard of performance).

4. Admissions Procedure

4.1 General Procedure

All applicants for admission will initially be examined and evaluated by the department, institute, or school in which the applicant wishes to study. All supporting documents (transcripts, letters of reference, etc.) must be received before any application can receive formal consideration.

Completed applications of those students whom the department wishes to recommend for admission will be forwarded to the Dean of the Faculty of Graduate Studies and Research for consideration. The office of the Dean will officially notify each applicant whose admission is approved.

4.2 Admission Validity for New Students

The Statement of Standing on Admission issued to each newly-admitted student is valid only for the twelve-month period stipulated on the form. If the applicant fails to register within this period of time, his/her admission and registration eligibility will lapse automatically. He/she may re-apply for admission.

4.3 Revocation of Admission or Registration

The University may nullify an admission and revoke a registration if it finds that an applicant for admission or registration has, in the process, provided false or incomplete information.

5. Program Requirements

5.1 General Information

A description of each program offered under the auspices of the Faculty of Graduate Studies and Research is presented in the departmental Program Descriptions and Details of Courses section of this Calendar. Prospective applicants should note particularly the admission requirements, the fields in which advanced study and research may be undertaken, and the program requirements of each department, in addition to the general regulations of the Faculty of Graduate Studies and Research, which are spelled out in this section.

5.2 Qualifying-Year Program

Students in the qualifying year will ordinarily register in 5.0 credits, at the senior undergraduate level. Of these five, normally no more than 1.0 credit at the 200-level and no more than 2.0 credits at the 500-level may be taken.

5.3 Master's Program

The normal requirement for the master's degree is 5.0 credits, of which at least 4.0 (including the thesis where applicable) must be at the 500-level. With departmental approval, the remaining 1.0 credit may be selected from those offered at the senior undergraduate level, that is, at the 400-level.

Where applicable, the normal requirement for a 10.0 credit master's degree is 10.0 credits, of which at least 8.0 credits (including the thesis where applicable) must be at the 500-level. With departmental approval, the remaining 2.0 credits may be selected from those offered at the senior undergraduate level, that is, at the 400-level.

5.4 Doctoral Program

Ordinarily, all courses taken for credit towards the Ph.D. degree must be at the 500- or 600-level.

The thesis will ordinarily carry a weight of about half of the total requirement of 10.0 credits.

5.5 Language Requirements

Some graduate programs require a reading knowledge of one or more languages other than English. Language requirements will be prescribed by departments according to their regulations and the needs of their students. Language requirements must be completed within the time limit allowed for the completion of the student's program.

6. Transfer of Credit

6.1 Transfer of Credit on Admission

Graduate courses completed at another institution or at Carleton University may be accepted in partial fulfillment of Carleton's degree requirements. Credit for such work will be determined in each case by the Faculty of Graduate Studies and Research on the recommendation of the department concerned. Master's candidates in a 5.0 credit program are allowed a maximum of 2.0 transferred credits. In addition, if a master's candidate is granted transfer of credit for 2.0 credits, his/her remaining 3.0 credits at Carleton must be at the 500-level.

Master's candidates enrolled in programs other than 5.0 credits will be permitted to transfer the equivalent up to but no more than 40 percent of their program credit requirements on admission. In addition, if a master's candidate is granted transfer of credit for 2.0 credits, his/her remaining 3.0 credits at Carleton must be at the 500-level.

Doctoral candidates may be given up to one year's credit for work completed at other universities but must normally register for a minimum of one year of full-time studies thereafter at Carleton and fulfil the thesis and comprehensive examination requirements. Students admitted with transfer of credits in a Ph.D. program may be required to pass a qualifying examination upon entry.

A candidate who has completed credits as a special student is not normally permitted to

transfer such credits for degree credit in the Faculty of Graduate Studies and Research.

Special students enrolled in a graduate level course are subject to the special student regulations outlined in the Undergraduate Calendar.

6.2 Transfer of Credit After Admission

A student formally admitted to and eligible to register in a graduate program is not permitted to register at Carleton University at the same time in any other graduate program or as an undergraduate or special student. Should he/ she do so, credits may not be transferred.

Similarly, if a student normally admitted to a graduate program at Carleton wishes to enrol in courses at another university, credit will be granted only if written permission is received from the Dean of the Faculty of Graduate Studies and Research. Such permission must be received in advance of registration for the course work. In no case will such transfer alter the maximum number of allowable transferred credits noted above.

7. Registration and Course Selection

7.1 The Calendar Year

The Faculty of Graduate Studies and Research divides the calendar year into three terms, and the academic year (September-May) into two terms; each term comprises about thirteen weeks of lectures or seminars. The first term of the academic year is designated as the Fall term (registration period at the beginning of September); the second term of the academic year is designated as the Winter term (registration period early in January); and the third term of the calendar year is designated as the Spring/Summer term (registration period in early May). The precise dates of registration for the Fall, Winter, and Spring/Summer terms are specified in the Academic Schedule section of this Calendar.

7.2 Course/Program Approval

Graduate students must have approval from their departmental supervisor of graduate studies for initial course/program registration, and for any subsequent course changes. This approval is also required for any undergraduate student who wishes to register in a graduate-level course.

Credit will be granted only for those courses and research activities for which the candidate is formally registered. An unregistered student is not entitled to attend lectures, tutorials, or seminars, and is not entitled to thesis supervision, examination privileges, or access to research facilities. A student will receive no credit for any work completed during a term in which he/she was not properly registered.

7.3 Student Records Information

Names
As the University is committed to the integrity of its student records, each student is required to provide on the application for admission his/her complete, legal name. Any requests to change a name, by means of alteration, deletion, substitution, or addition, must be accompanied by appropriate supporting documentation. Upon making application for graduation, students may be asked to provide proof of their name.

Addresses
Incorrect address information will delay the receipt of awards and student information. Students must notify the office of the Faculty of Graduate Studies and Research immediately of any change in:

- permanent or home address (used for registration information)

- local address (used for all mail during the academic session)

- telephone number for permanent address and for local address

Disclosure
The Ministry of Training, Colleges and Universities and Statistics Canada require that Carleton University provide to them information pertaining to a student's status and other selected personal information. Upon registration as a student, one is deemed to agree to the disclosure by Carleton University of the student's status and other selected personal information pursuant to any such requirement.

7.4 Revocation of Registration/ Admission

The University may nullify an admission and revoke a registration if it finds that an applicant for admission or registration has, in the process, provided false or incomplete information.

7.5 Course Selection

A student proceeding to a graduate degree, diploma, or certificate must arrange his/her program according to the regulations of the Faculty of Graduate Studies and Research and the major department.

The course and thesis requirements of each graduate program are organized or defined in units of credits: 1.0 credit typically comprises three hours of lectures or seminars a week for two terms, or the equivalent; 0.5 credit typically comprises three hours of lectures or seminars a week for one term, or the equivalent.

7.6 Evaluation

To gain standing in a course, a student must meet the course requirements for attendance, term work, and examinations. Instructors will inform their classes by distributing written notices, before the last day for late registration, of the elements and their weighting that will contribute to the final grade, including (where applicable) attendance, class participation, essays, tests, laboratories, studio-workshops, other course-related work assignments, and final examinations.

7.7 Tutorials

These are arranged to allow students to take full advantage of all the resources of the University, even in areas or fields of a very highly specialized nature. Such arrangements are subject to the approval of the supervisor of graduate studies, who will arrange that a document spelling out the details of the topic, reading list, etc., is submitted to the office of the Faculty of Graduate Studies and Research before the last day for course changes in the term concerned.

7.8 Audit Course

Graduate students may register to audit 1.0 credit per program.

- Full-time students will not be charged an additional fee; others must pay the prevailing fee for part-time students.

- Part-time students will not be permitted to audit a course in addition to two 0.5 credits per term.

7.9 Course Numbering System

Each course is designated by an eight-character alphanumeric code. The first four letters indicate the department, school, or committee under whose auspices the course is offered. The four numerical digits following identify the specific course. The credit value is indicated in square brackets following the course number. The old Carleton course number (in parentheses) is included for reference, where applicable.

7.10 Status

Prior to May 1, 1996
All students admitted and registered prior to May 1, 1996 are reminded that status is established by formal registration in the appropriate courses for each term of activity in the calendar year. Those students registering solely in a thesis, research essay, or independent research project will declare whether their status is full-time or part-time according to the definition in 7.11 and 7.12.

Important Note
All students in this category will be eligible for post-residency fee rates for the duration of their program unless:

(i) a re-admission is required because the time for completion of degree has expired

(ii) a new admission is required in cases of an approved degree transfer or new degree admission.

In the cases noted above, students will lose their grandparent fee status and will be subject to the current fee rates, i.e., the same fee rates that apply to students initially registered and admitted after May 1, 1996.

After 1 May 1996
All students admitted and registered after May 1, 1996 should note:

(i) the elimination of post-residency status and fee rates associated with post-residency for all admitted graduate degree students. Post-residency is defined as those students in the second or subsequent year of full-time study in a master's program; third or subsequent year of full-time study in the School of Public Administration, School of Journalism and Communication, or School of Social Work; and third or subsequent year of full-time study in a Ph.D. program.

(ii) that full- or part-time status is established by admission status and initial program registration. Graduate students admitted and registered after May 1, 1996 who apply and are admitted as full-time students and who initially register as full-time students will be required to continue and complete their program as full-time students, and will be assessed full-time fees for the duration of their program; graduate students admitted and registered after May 1, 1996 who apply and are admitted as part-time students and who initially register as part-time students will be required to continue and complete their program as part-time students, and will be assessed part-time fees for the duration of their program.

7.11 Definition of Full-Time Status

Full-time course load for all students (admitted and registered prior to and after May 1, 1996)

A full-time graduate student will normally register in a minimum of 1.5 credits per term. An audit is not permitted as part of the 1.5 credits required per term to maintain full-time status.

In addition to the course load requirements described above, the following criteria for full-time status have been established by the Faculty of Graduate Studies and Research for all students (admitted and registered prior to and after May 1, 1996).

A full-time graduate student must:

(i) identify himself or herself at the point of first registration as a full-time graduate student

(ii) be considered a full-time graduate student by his or her supervisor

(iii) be designated as a full-time graduate student by the University

Students who are unsure of their status should contact the office of the Faculty of Graduate Studies and Research for assistance, at (613) 520-2525.

7.12 Definition of Part-Time Status

Part-time course load for all students (admitted and registered prior to and after May 1, 1996)

A part-time graduate student will normally register in a maximum of 1.0 credit per term, including audit courses.

In addition to the course load restriction described above, the following criteria for part-time status have been established by the Faculty of Graduate Studies and Research for all students (admitted and registered prior to and after May 1, 1996).

A part-time graduate student must:

(i) identify himself or herself at the point of first registration as a part-time graduate student

(ii) be considered a part-time graduate student by his or her supervisor

(iii) be designated as a part-time graduate student by the University

7.13 Change of Status from Full-Time to Part-Time

Students who have valid reasons for changing status from full-time to part-time for a term may apply for permission by:

• writing to the Dean of the Faculty of Graduate Studies and Research stating the reason(s) for seeking exemption from the full-time registration requirements stated in 7.10 and 7.11

• requesting a statement from the departmental graduate supervisor (and the thesis supervisor if there is one) in support of their request, confirming that they will be infrequently on campus for the term, will be using the University facilities (i.e., library, laboratories, computer centre, etc.) on a part-time basis, and will be receiving supervision on a part-time basis, including supervision through correspondence

It is understood that such a status change will be granted only in exceptional cases (e.g., for medical or other special reasons.)

Exemptions are normally granted for a term, but, in extraordinary circumstances, approval may be granted for a longer period.

7.14 Off-Campus Research

In the interest of enriching their learning experience, graduate students may arrange to undertake full-time studies or research at another institution or in the field. It should be understood that such activity would apply to only a part of the total program and that the off-campus period would not normally exceed twelve months.

Requests for permission to undertake full-time off-campus study or research must be submitted, well in advance, to the Dean of the Faculty of Graduate Studies and Research through the department concerned. Such requests should include the following information:

• a detailed statement of the research proposal or program of studies, and the specific arrangements that are proposed for the supervision and direction of the work

• an explanation of the reasons why the work cannot be satisfactorily undertaken while on campus at Carleton University

• a description of the studies and/or research facilities that are available at the proposed off-campus location

• a written statement from a responsible official (for example, the on-site supervisor or director) of the outside institution confirming that the proposed arrangements are satisfactory and that the candidate will be able to undertake research or studies

• a time schedule for the proposed studies or research work

• a statement of the candidate's expected sources of financial support

7.15 Inter-University Cooperation in Graduate Instruction

Under certain circumstances, it is permissible for a student admitted to a graduate degree program and registered at one Ontario university to follow an approved credit course at another university. All interested students should consult the chair of their department, prior to registration, in order to obtain further information on procedures and conditions of eligibility. In order for this procedure to be valid, students must be officially registered at their home institution by contacting the office of the Faculty of Graduate Studies and Research.

7.16 University of Ottawa

Carleton University and the University of Ottawa have developed a number of joint programs at the graduate level. The details of

these are given under the appropriate academic unit later in this Calendar.

Where formal joint programs do not exist, a graduate student may be permitted to follow up to 2.0 credits at the University of Ottawa. Moreover, there are reciprocal arrangements worked out among departments, institutes, and schools at both universities to involve students, when it is desirable, in parts of the program of research and studies at the other institution. All interested students should consult the chair of their department, institute, or school, prior to registration, in order to obtain further information on particular departmental conditions of eligibility and procedures. In order for this procedure to be valid, students must be officially registered at their home institution by contacting the office of the Faculty of Graduate Studies and Research.

8. Continuous Registration

8.1 Loss of Status

Any candidate who remains unregistered in his/her degree program for three terms (twelve months) will lose his/her graduate status.

8.2 Continuous Registration in Thesis, Research Essay, or Independent Research Project

Any candidate (full-time or part-time), after initial registration in a thesis, research essay, or independent research project, must maintain this registration in all successive terms (including the term in which the student is examined) until his/her thesis, research essay, or independent research project is completed. Completion means modifications, any retyping involved, etc. Students should note that faculty approval to register in the thesis, etc, is given on the understanding that the student will be in regular contact with his/her supervisor, and that thesis research will be actively pursued in each term of registration.

8.3 Deposit of Thesis Copies

In the case of a thesis, registration must be maintained until five final copies are deposited in the office of the Faculty of Graduate Studies and Research. Should the final copies not be deposited in the office of the Faculty of Graduate Studies and Research by the last day for late registration in a given term, the student will be required to register for that term.

8.4 Reinstatement

Students whose files have been closed as a result of failure to observe continuous registration requirements must apply for reinstatement if they wish to continue their studies. If reinstated, students must pay a reinstatement charge, which consists of $50 *plus the equivalent of 1.0 credit tuition fees for each term in which they failed to register.*

The reinstatement charge is a tuition fee and therefore is defined as eligible for income tax deduction.

8.5 Exemption from Registration

Students who have valid reasons for not registering for a term may apply for permission to remain unregistered by:

- writing to the Dean of the Faculty of Graduate Studies and Research stating the reasons for seeking exemption from registration

- requesting a statement from the departmental supervisor of graduate studies (and from their thesis supervisor, if there is one) in support of their request, confirming that they will not be on campus for the term, will not use any University facilities (that is, library, laboratories, computer centre, etc.), or receive any supervision, including supervision through correspondence

- applying to the Dean of the Faculty of Graduate Studies and Research through their graduate department for a one- to three-term maternity leave during their program of study. While on leave students will not be registered with the faculty, nor will they be required to pay fees for this period. They will not be eligible to receive awards administered by Carleton University during the leave. In the case of other awards, the regulations of the particular granting agency will apply. The time limit for completion of the program will be extended by the duration of the leave taken. Where possible, the start and finish of the leave should coincide with the start and end of a term.

A charge of $50 per term for leave of absence must accompany each request.

It is understood that such an exemption from registration will be granted only in exceptional cases (for example, medical or other special reasons).

Exemptions are normally granted for one term, but in extraordinary circumstances an exemption may be granted for a longer period.

When exemption from registration for a term or terms has been approved by the Dean of the Faculty of Graduate Studies and Research, this period will be exempt from the overall time limit allowed for completion of the program.

8.6 Off-Campus Registration

Students who have been permitted to study off campus while registered full-time at Carleton, may register using Touchtone Telephone Registration.

8.7 Course Changes

A course change is the addition or deletion of one or more individual courses by a registered graduate student. This is the only acceptable procedure for revising or correcting a graduate student's registration. All course changes must be approved by the student's department.

Note: The deadline dates for course changes are stipulated in the academic schedule of this Calendar.

8.8 Withdrawal

A graduate student wishing to terminate his/her registration in a graduate program (that is, drop all courses) must consult with his/her department prior to withdrawal.

• *Withdrawal Credit*

When a student officially withdraws, a withdrawal credit will be calculated on a pro rata basis as of the date of withdrawal or receipt of letter. Credit for fees or refunds will depend on the date of withdrawal and the amount of fees originally paid. Students are encouraged to examine the financial implications of withdrawal. A refund schedule is available at the Business Office

• *Mid-Term Transfer of Program*

Graduate students are cautioned that there is no procedure at Carleton University for direct "mid-term" transfer from one graduate program to another. Similarly, there can be no direct transfer to or from undergraduate or special student status. Any candidate who elects to change programs after registration (before the last day of late registration) will be required to withdraw from the first program and then register in the second. The pro rata refund of fees calculated as a result of withdrawal from the first program can be applied against the new fee assessment for the second program.

• *Degree Completion*

A registered candidate who completes his/her degree requirements by depositing the thesis/ research essay prior to the last day for withdrawal in any term (as specified in the academic schedule) is required to withdraw formally if he/she anticipates any refund of fees.

Note: This only applies to thesis or research essay registration.

9. Examinations

9.1 General Remarks

Final examinations in courses will be held at the times indicated in the academic schedule. Graduate students must obtain grades that meet the standards outlined in Section 11, Academic Standing, and that satisfy the specific requirements of the department concerned.

9.2 Special/Deferred Final Examinations

A graduate student who is unable to write a final examination because of illness or other circumstances beyond his/her control, or whose performance on the examination has been impaired by such circumstances, may apply to write a special or deferred final examination. Such an application will be considered only if it is submitted in writing to the Dean of the Faculty of Graduate Studies and Research within two weeks of the examination.

If the student has been seen at the University Health Services, the office of the Dean will confirm the illness by contacting the treating physician. If the student has consulted a physician outside the University, he/she will be required to submit a statement from the physician confirming the illness.

In cases other than illness, appropriate documents will be required.

Students with special needs may also apply for special/deferred final examinations by contacting the Faculty of Graduate Studies and Research.

9.3 Master's Examinations and Deadlines

In addition to any examination which may be required in individual courses, a master's candidate who is writing a thesis will be expected to undertake either an oral defence of the thesis or a comprehensive examination in his/her field of specialization, or both. Please refer to Thesis Specifications, Section 12.5, Master's, for submission deadlines. When the degree is taken by course work, a comprehensive examination may be required. It is important to note that individual departments may have additional or particular requirements.

Some departments specify deadlines for the submission of thesis proposals and for comprehensive examinations. Students should check the Calendar entry for their department.

9.4 Doctoral Examinations and Deadlines

Doctoral candidates may be asked to pass a qualifying examination at the beginning of their residence at Carleton University.

A comprehensive examination covering prescribed fields will normally be undertaken

one year prior to the thesis presentation. This examination (oral or written, or both) may include any material considered fundamental to a proper comprehension of the field of study.

After the thesis has been received and accepted for examination, a final oral examination on the subject of the thesis and related fields will be held. Please refer to Thesis Specifications, Section 12.5, Doctoral, for submission deadlines.

Some departments specify deadlines for the submission of thesis proposals and for comprehensive examinations. Students should check the Calendar entry for their department.

9.5 Comprehensive Examinations

The date, place, and time of comprehensive examinations will be announced at least two weeks in advance. An examining board will be appointed according to the guidelines laid down by the Faculty of Graduate Studies and Research.

9.6 Unsatisfactory Grades

If the comprehensive examination is graded Unsatisfactory, the department may permit the candidate to repeat the examination. If the comprehensive examination is graded Unsatisfactory for a second time, a request by the department that the candidate be allowed to continue in the program would require the approval of the Faculty of Graduate Studies and Research.

The comprehensive and thesis examination processes must be conducted according to the principles and practices prescribed by the Faculty of Graduate Studies and Research.

10. Grading System

10.1 Letter Grades

Carleton University employs the twelve-point system of letter grades to represent standing in graduate lecture courses, directed studies, seminars, tutorials, and some research essays. The letter grades used and the grade point equivalents are as follows:

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

The following percentage equivalents apply to all final grades at Carleton.

A+	90-100	B+	77-79
A	85-89	B	73-76
A-	80-84	B-	70-72
C+	67-69	D+	57-59
C	63-66	D	53-56
C-	60-62	D-	50-52

10.2 Other Grading Notations

Under certain defined circumstances, notations are used instead of letter grades to represent standing. The only notations permissible in the Faculty of Graduate Studies and Research are the following:

- a notation of *Satisfactory* or *Unsatisfactory* may be assigned, subject to the approval of the Faculty of Graduate Studies and Research, in certain very special courses involving practicum, field work, or other complex activities not easily adaptable to the twelve-point system of grading

- comprehensive examinations are graded *Pass With Distinction*, *Satisfactory*, or *Unsatisfactory*

- the master's thesis is graded *Pass With Distinction*, *Satisfactory*, or *Unsatisfactory*. The oral defence is graded *Satisfactory* or *Unsatisfactory*

- the Ph.D. thesis and its oral defence are each graded *Satisfactory* or *Unsatisfactory*

- a notation of *Incomplete* may, subject to the approval of the chair of the department, be assigned to a course in which the student has been granted the privilege of submitting an assignment after the final deadline date. This notation of Incomplete will be permissible only in exceptional cases (for example, medical or other special reasons) and must be replaced with a letter grade within *forty* days of the end of classes. If the notation of *Incomplete* is not changed to a letter grade (through the regular change-of-grade procedures) within forty days of the end of classes, the *Incomplete* notation will be changed to a grade of F, which will remain as a permanent entry on the student's record. In exceptional cases students may petition the Dean of the Faculty of Graduate Studies and Research to have the *Incomplete* notation remain on the student record. With the permission of the Dean of the Faculty of Graduate Studies and Research, students may register to repeat the course in order to obtain a letter grade. For circumstances that go beyond the forty day period (for example, medical or other special reasons), students may apply for a deferral (refer to Special/Deferred Final Examinations, Section 9.2)

- *Fail:* a notation of F will be assigned to any course in which the student has failed

- a notation of *Absent* will be assigned to any course in which the student failed to attend the final examination. If the student explains his/her absence (in writing) to the Dean of the Faculty of Graduate Studies and Research within *fourteen* days of that examination, he/she may be granted the privilege of undertaking a special or deferred examination. The notation of *Absent* will also be assigned where a student has terminated a course without formally withdrawing from the course prior to the end of classes; this notation is deemed the equivalent of a failure

- if a thesis, research essay, independent research project, or comprehensive examination is not completed by the end of the period of registration, the notation of *In Progress* will be recorded. The notation *In Progress* may, subject to the approval of the Faculty of Graduate Studies and Research, be used for a research seminar, i.e., a seminar in which students present the results of their thesis research. This notation must be replaced by an appropriate final notation or grade (as specified above) after the thesis, research essay, independent research project, or research seminar has been examined. In cases where a student has registered in a research essay or a thesis without completing it and later undertakes course work to complete the degree program, or loses graduate student status in the program, the notation In Progress will remain as a permanent entry on the student's record.

10.3 Release of Grades

Grades can be accessed through the Touchtone Telephone System for each student as soon as the grades are available after the end of the fall and winter terms of the Fall/Winter session and after the end of the spring session. Transcripts required for professional and graduate schools should be ordered well in advance of any deadline set by these institutions. Students are advised that no official transcripts will be released by the University until all outstanding accounts due have been paid.

11. Academic Standing

11.1 Qualifying-Year Program

Students should note that admission to the master's program from qualifying year is governed by the admission requirements in Section 2, Admission Requirements and Eligibility.

11.2 Master's Program

A grade of B- or better must normally be obtained in each course credited towards the master's degree. A candidate may, with the recommendation of his/her department and the approval of the Dean of the Faculty of Graduate Studies and Research, be allowed a grade of C+ in 1.0 credit. Some departments do not permit the C+ option; students should check carefully to see if the department in question has a B- minimum rule.

• Full-Time Continuation

Full-time master's candidates who fail to achieve a weighted GPA of 7.0 after two terms of study, or to maintain it subsequently, will be required to withdraw from the program. In the event of special or extenuating circumstances, the student may apply to the Dean of the Faculty of Graduate Studies and Research for permission to continue in the program.

- *Part-Time Continuation*

A part-time master's student who fails to achieve or maintain a weighted GPA of 7.0 after completing 2.0 credits will be required to withdraw from the program.

11.3 Doctoral Program

Doctoral students must normally obtain a grade of B- or better in each course credited towards the degree.

11.4 Departmental Evaluation

In addition to the above requirements, departments will undertake a periodic evaluation of a student's progress in his or her overall program of studies and research to determine whether that progress is satisfactory. In the event that progress is deemed unsatisfactory, the department may recommend to the Dean of the Faculty of Graduate Studies and Research that the student be required to withdraw.

11.5 Religious Accommodation

Carleton University accommodates students who, by reason of religious obligation, must miss an examination, test, assignment deadline, laboratory, or other compulsory event.

Accommodation will be worked out directly and on an individual basis between the student and the instructor(s) involved. Students should make a formal request to the instructor(s) in writing for alternative dates and/or means of satisfying requirements. Such requests should be made during the first two weeks of any given academic term*, or as soon as possible after a need for accommodation is known to exist, but in no case later than the penultimate week of classes in that term. Instructors will make reasonable accommodation in a way that shall avoid academic disadvantage to the student.

Students unable to reach a satisfactory arrangement with their instructor(s) should contact the Director of Equity Services. Instructors who have questions or wish to verify the nature of the religious event or practice involved should also contact this officer.

* When a student's presence is required prior to the date on which classes begin (e.g. For field trips or Orientation activities) any student who cannot meet this expectation of attendance for reasons of religious accommodation should notify the appropriate Faculty Registrarial Services Office in advance.

12. Thesis Requirements

Guidelines for the preparation of graduate theses and information on the procedures for examination of graduate theses are available on the World Wide Web at: www.gs.carleton.ca. This information is also available in the Graduate Student Handbook, which is produced jointly by the Faculty of Graduate Studies and Research and the Graduate Students' Association.

12.1 General Remarks

The thesis is a major requirement of most programs and, in conjunction with the research for it, makes up at least one half of the time normally required for the program. The thesis must be expressed in a satisfactory literary form, consistent with the discipline concerned, and must display a scholarly approach to the subject and thorough knowledge of it. A critical review of previous work related to the subject should usually be given.

A candidate will not be permitted to submit a thesis for which he or she has previously received a degree; however, with the permission of the Dean of the Faculty of Graduate Studies and Research, he or she may incorporate into the thesis material that was included in a previous thesis.

12.2 Master's Thesis

The master's thesis should embody the results of successful scholarly research in a specialized area. It should exhibit the candidate's knowledge of recognized techniques of investigation and critical evaluation, and be presented in an organized and systematic way.

• *Oral Examinations*

Candidates are ordinarily required to undertake an oral examination of the thesis. Please refer to Thesis Specifications, Section 12.5, Master's, for submission deadlines. The master's thesis will be examined by a board consisting of at least four members, including the thesis supervisor, the chair of the department concerned, an examiner from a department other than that of the candidate, and one

additional member from the department concerned. The chair of the department concerned will announce the constitution of the examining board; both it and the thesis examination process are defined by guidelines, principles, and practices prescribed by the Faculty of Graduate Studies and Research.

• *Thesis Weight*

Thesis weight (1.0 to 3.0 credits) must be identified at the time of admission. A change in the thesis weight at a later date would require the approval of the Dean of the Faculty of Graduate Studies and Research.

• *Research Essays and Independent Research Projects*

Faculty regulations governing research essays and independent research projects are normally the same as those for master's theses, and subject to the guidelines, principles, and practices prescribed by the Faculty of Graduate Studies and Research.

12.3 Doctoral Thesis

The doctoral dissertation must report, in an organized and scholarly fashion, the results of original research. The thesis must be a contribution to knowledge, and must demonstrate the candidate's ability to undertake sustained research and to present his/her findings in an appropriate manner.

• *Oral Examinations*

The thesis must be defended successfully at an oral examination. Please refer to Thesis Specifications, Section 12.5, Doctoral, for submission deadlines. The doctoral thesis will be examined by a board consisting of at least five members, including the thesis supervisor, the chair of the department concerned, an examiner from a department other than that of the candidate, the members of the candidate's advisory committee, the Dean of the Faculty of Graduate Studies and Research or his delegate, and an external examiner who is a recognized authority on the subject of the thesis.

The Dean of the Faculty of Graduate Studies and Research will announce the constitution of the examining board; both it and the thesis examination process are defined by guidelines, principles, and practices prescribed by the Faculty of Graduate Studies and Research.

• *Thesis Weight*

Thesis weight (ordinarily about half of the total Ph.D. requirements of 10.0 credits) must be identified at the time of admission. If the thesis weight falls within a range of credit weights, it should be assigned at the time of admission a weight corresponding to the lower bounds of that range. A change in the thesis weight at a later date would require the approval of the

Dean of the Faculty of Graduate Studies and Research. The work of each Ph.D. candidate will be assisted by an advisory committee of faculty members who will aid the candidate in his/her preparation for the final comprehensive examination, and assist in the evaluation of the thesis and oral examinations.

12.4 Deadlines

• *Master's Thesis*

A master's student expecting to graduate at the Spring Convocation must submit his/her thesis to his/her supervisor, in examinable form, by March 1. A master's student expecting to graduate at the Fall Convocation must submit his/her thesis by August 1. A master's student expecting to graduate at the Winter Graduation must submit his/her thesis by December 1.

• *Doctoral Thesis*

A Ph.D. student expecting to graduate at the Spring Convocation must submit his/her thesis to his/her supervisor, in examinable form, by March 1. A Ph.D. student expecting to graduate at the Fall Convocation must submit his/her thesis by August 1. A Ph.D. student expecting to graduate at the Winter Graduation must submit his/her thesis by December 1.

12.5 Specifications

• The candidate must submit six printed copies (original and five acceptable duplicated copies, on bond paper) and must comply with the special departmental requirements governing the form of the thesis, including methods of bibliographical entry and the use of diagrams and tables.

• Each thesis must be accompanied by a suitable abstract. The abstract of a master's thesis should not exceed 150 words, while the abstract of a doctoral thesis may be up to 350 words in length.

• Regulations regarding style, pagination, certification, acceptance, grade and size of paper, as well as abstracts, reproduction, microfilming, binding, and the constitution of the examining board will be prescribed by the Faculty of Graduate Studies and Research.

• *Master's Thesis*

The candidate is expected to notify his/her supervisor and the chair of the department at least two weeks in advance of the date on which he/she intends to submit the completed thesis. The candidate is then expected to submit six copies of the completed thesis to the department at least four weeks in advance of the intended date of examination. The thesis examination and defence will then be scheduled and the date will be announced at least two

weeks in advance. The department must deposit one copy of the thesis to the office of the Faculty of Graduate Studies and Research at least two weeks in advance of the actual date for the examination and defence.

• *Doctoral Thesis*

The candidate is expected to notify his/her supervisor and the chair of the department at least two weeks in advance of the date on which he/she intends to submit the completed thesis. The candidate is then expected to submit six copies of the completed thesis to the department at least six weeks in advance of the intended date of examination. The thesis examination and defence will then be scheduled and the date will be announced by the Dean of the Faculty of Graduate Studies and Research at least four weeks in advance. The department must deposit one copy of the thesis to the office of the Faculty of Graduate Studies and Research at least four weeks in advance of the actual date for the examination and defence.

• Five unbound copies of the approved thesis, the original and four others, should be submitted for binding to the Faculty of Graduate Studies and Research. Each copy must be presented in order of pagination in a separate envelope. Two copies are maintained in the library, the third copy is given to the department, the fourth copy is for the candidate, and the fifth copy is for the thesis supervisor. If the thesis was supervised by two faculty members, the Faculty of Graduate Studies and Research will accept six unbound copies.

12.6 Licence to the University and to the National Library of Canada

In the interest of facilitating research by members of the Carleton community and by interested outsiders, and in consideration of his/her having been accepted as a graduate student at Carleton, the student author of a thesis or dissertation submitted in partial fulfillment of the requirements for an advanced degree shall grant to the University and to the National Library of Canada a license to make single copies or microfilms, solely for the purpose of private study and research, in response to written requests from individuals, libraries, universities, or similar institutions.

It is understood that the student author retains other publication rights, and that neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

12.7 Withholding of Thesis Deposition

If, at the time of submitting his/her thesis, the student elects to protect any rights to immediate commercial publication, or to obtain a patent which may arise from his/her research, or to keep his/her thesis out of circulation for other reasons, he/she may apply in writing to the Dean of the Faculty of Graduate Studies and Research requesting that the thesis be withheld from deposit in the library:

- for an additional period of three months, without reason

- for each additional period of six months, with reason (total period of restriction not to exceed two years)

The student must submit any request for extension of the restriction one month prior to the termination of the previous period. The student and his/her supervisor will be required to justify the extension of the restriction. Subsequent requests must follow the same procedure.

13. Time Limits for Program Completion

13.1 General Remarks

There are maximum time limits for the completion of programs. Candidates may also be subject to time constraints prescribed by individual departments to ensure orderly progress through the stages of their programs.

13.2 Master's Program

- *Full time*

Full-time master's candidates must complete their degree requirements within six terms of registered full-time study. Students admitted to a 10.0 credit master's program (that is, in the School of Public Administration, the School of Journalism and Communication, and the School of Social Work) must complete their degree requirements within nine terms of registered full-time study.

- *Part time*

A part-time master's candidate must complete his/her degree requirements within an elapsed period of six calendar years after the date of initial registration. Students admitted to a 10.0 credit master's program (that is, in the School of Public Administration, the School of Journalism and Communication, and the School of Social Work) must complete their degree requirements within an elapsed period of eight calendar years after the date of initial registration.

- *Combined Full Time and Part Time*

A master's candidate who elects to complete his/her program by a combination of full-time and part-time study is governed by the following elapsed-time limitations: five calendar years if the candidate is registered as a full-time student for two or three terms and part-time for the balance; four calendar years if the candidate is registered for four or five terms as a full-time student and part-time for the balance.

These limitations are calculated from the date of initial registration in the master's program.

- Combined Full-Time and Part-Time in 10.0 credit Master's Programs in the School of Public Administration, the School of Journalism and Communication, and the School of Social Work

A master's candidate who elects to complete his/her program by a combination of full-time and part-time study must complete the degree requirements within an elapsed period of eight calendar years after the date of initial registration in the master's program.

13.3 Doctoral Program

- *Full Time*

A full-time Ph.D. candidate who is admitted on the basis of a master's degree (that is, with a program of 10.0 credits or the equivalent) must complete the Ph.D. degree requirements within an elapsed period of six calendar years after the date of initial Ph.D. registration.

- *Part Time*

A Ph.D. candidate who undertakes the program by a combination of full-time and part-time study must complete the degree requirements within an elapsed period of eight calendar years after the date of initial registration in the Ph.D. program.

13.4 Exemption from Time Limit

When exemption from registration for a term or terms has been approved by the Dean of the Faculty of Graduate Studies and Research, this period will be exempt from the overall time limit allowed for completion of the program. A charge of $50.00 per term of exemption from the time limit must accompany each request.

13.5 Extension of Time Limit

In exceptional cases, an extension of time permitting further registration (one or two terms) may be granted to a candidate whose recent progress, as judged by the department, has been otherwise satisfactory. Requests for extension of time should be directed to the Dean of the Faculty of Graduate Studies and Research through the department concerned.

A charge of $50 per term of extension beyond the normal time limit must accompany each request.

13.6 Grade Review

Within two weeks of the release of grades or the announcement of examination by committee (comprehensive examination, research essay or thesis) results, a graduate student may request, through the Dean of the Faculty of Graduate Studies and Research, that one or more of his/her grades or results be reviewed. The results of examination by committee (including comprehensive, research essay or thesis examinations) will only be reviewed on procedural grounds. Grades for other courses will be reviewed through the submission of all or part of the written coursework anonymously to two re-readers, whose average grade will replace the original of the reviewed work. Parts of grades based on non-written work (e.g., participation) will not be reviewed. The charge for such a review is $50, which must accompany the review request. Note: The review process will not take place if the fee is not remitted. If the grade is raised, the $50 charge is refundable.

13.7 Program Review

A graduate student has the right to request a review of decisions made concerning his/her graduate status or any other ruling relating to his/her program. All such requests are to be made in writing to the Dean of the Faculty of Graduate Studies and Research.

13.8 Records Retention Policy

Since 1990 the University has implemented a records retention policy which provides for the destruction of student file folders and their contents after a period of ten years has elapsed since the last registration. This policy applies to those students who are formally admitted and registered in degree programs. Further information on this policy can be obtained by contacting the Faculty of Graduate Studies and Research.

14. Instructional Offences

14.1 Regulations

The Senate of the University has enacted the following regulations for instructional offences at the graduate level:

Any student commits an instructional offence who:

(a) cheats on an examination, test, or graded assignment by obtaining or producing an answer by deceit, fraud, or trickery, or by some act contrary to the rules of the examination

(b) submits substantially the same piece of written work to two different courses. Minor modifications and amendments or changes of phraseology do not constitute a significant and acceptable reworking of an essay or paper

(c) contravenes the regulations published at an examination or which are displayed on the reverse side of a properly authorized examination booklet

(d) commits an act of plagiarism. Plagiarism will be deemed to have occurred when a student either:

(i) directly copies another's work without acknowledgement; or

(ii) closely paraphrases the equivalent of a short paragraph or more without acknowledgement; or

(iii) borrows, without acknowledgement, any ideas in a clear and recognizable form in such a way as to present them as the student's own thought, where such ideas, if they were the student's own, would contribute to the merit of his or her own work

(e) disrupts a class or other period of instruction if he or she:

(i) is a registered member of the class or period of instruction

(ii) is warned to discontinue any act or behaviour reasonably judged by the instructor of the course or period of instruction to be detrimental to the class, and having ignored such warning is ordered by the instructor to leave and refuses to leave

(f) Any student found in violation of these regulations may be:

(i) expelled

(ii) suspended from all studies at the University

(iii) suspended from full-time studies; and/or

(iv) awarded a reprimand

(v) refused permission to continue or to register in a specific degree program, but subject to having met all academic requirements shall be permitted to register and continue in some other program

(vi) placed on academic probation

(vii) awarded a Fail or Absent in a course or examination

Allegations of instructional offence may be investigated by instructors and/or departmental chairs and, in all cases, will be reported to the

faculty dean. The dean will promptly advise, in writing, the student and the University Ombudsman of the allegation and of the student's rights. The dean will review the allegation and if not resolved at that level, the allegation becomes subject to final disposition by a tribunal appointed by the Senate. Information about procedure governing tribunals is available from the Clerk of the Senate, Room 607, Robertson Hall.

15. Offences of Conduct

Offenses of Cond ct—Discrimination and Harassment

The University has in place policies and procedures to deal with allegations of discrimination and harassment, including sexual harassment. These are outlined in detail in the *Carleton University Human Rights Policies and Procedures*, effective May 1, 2001 and which can be found on the Carleton Web site under Equity Services.

Unacceptable conduct is outlined in the policy and includes discrimination or harassment based on race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, political affiliation or belief, sex, sexual orientation, gender identity, age, marital status, family status, or disability/handicap within the meaning of the Ontario Human Rights Code. Unacceptable conduct also includes threatening, stalking and unwelcome communication either in person or through electronic or other means. For the three policy sections below, the definition of prohibited behaviour is described in the italicized section which follows.

From the **Anti-Racism and Ethnocultural Relations Policy**

"6. The University prohibits discrimination and harassment, including conduct on the basis of race, ancestry, place of origin, colour, ethnic origin and citizenship that:"

From the **Gender Equality Policy**

"6. The University prohibits discrimination and harassment, including conduct on the basis of sex, gender or gender identity that:"

From the **Sexual Orientation Equality Policy**

"5. The University prohibits discrimination and harassment, including conduct on the basis of sexual orientation or perceived sexual orientation that:"

5.1 Is abusive, demeaning or threatening including behaviour such as name calling; derogatory remarks, gestures and physical attacks; or display of derogatory or belittling pictures and graffiti; or

5.2 Biases administrative and appointment decisions, employment and workplace practices, tenure, promotion, appointment, leave and salary determinations; or

5.3 Biases academic decisions such as admissions, grading, the application of regulations and requirements and scheduling of academic activities; or

5.4 Misuses power, authority or influence; or

5.5 Discriminates in the provision of goods and services, or access to premises, accommodation and other facilities."

From the **Sexual Harassment Prevention Policy**

"6. Sexual harassment occurs when an individual engages in sexually harassing behaviour or inappropriate conduct of a sexual nature that is known, or ought reasonably be known, to be unwelcome, and that:

6.1 Interferes with the academic or employment performance or participation in a University-related activity for the person harassed; and/or

6.2 Is associated with an expressed or implied promise of employment-related or academic-related consequence for the person harassed (including reward, reprisal or condition of study or employment); and/or

6.3 Provides a basis for academic or employment decisions affecting the person harassed; and/or

6.4 Creates an abusive, demeaning, or threatening study, work or living environment for the person harassed; and/or

6.5 Excludes the person harassed from rights and/or privileges to which they are entitled.

7. Sexually harassing behaviour may be physical, verbal or psychological. It may be conveyed directly or by telephone, writing or electronic means. Examples of inappropriate sexual conduct include:

7.1 Unwelcome sexual solicitations, flirtations or advances; sexually suggestive comments, gestures, threats or verbal abuse;

7.2 Unwarranted touching or physical contact of a sexual nature, coerced consent to sexual contact, or sexual assault;

7.3 Inappropriate display or transmission of sexually suggestive or explicit pictures, posters, objects or graffiti;

7.4 Leering, compromising invitations, or demands for sexual favours;

7.5 Degrading, demeaning or insulting sexual comment or content, including unwelcome

remarks, taunting, jokes or innuendo about a person's body, sexuality, sexual orientation or sexual conduct;

7.6 Misuse of position or authority to secure sexual favours;

7.7 Persistent, unwanted attention or requests for sexual contact after a consensual relationship has ended; or

7.8 A course of sexualized comment or conduct that interferes with the dignity or privacy of an individual or group."

Enforcement of this policy is carried out according to the procedures established in the policy. The procedures include the provision of advice and information to complainants and respondents and allow for various methods of informal resolution, including mediation.

Students with concerns regarding discrimination, harassment, stalking, sexist or racist behaviour, or any other prohibited action as outlined in the Human Rights Policy, should call or meet with a member of Equity Services for advice and guidance on how to handle the situation. This service is confidential and does not compel the student to take any further action.

Formal complaints must be made in writing and directed to the Dean or Vice President responsible for the area where the complaint took place. Staff in Equity Services are available to assist with the preparation of a formal complaint. Complaints must be made within 12 months after the last alleged incident of discrimination or harassment unless exceptional circumstances apply in which case the University Secretary may grant an extension of up to an additional 12 months.

The procedure for formal complaints is outlined below:

1. an allegation shall be made in writing to the Dean of the Faculty in which the program to which the respondent has been admitted belongs or, in the circumstances where the respondent has not been admitted to a program, to the Dean of the Faculty where the majority of courses in which the respondent has registered are administered. An allegation against a student in residence when made by another student in residence which involves the complainant's enjoyment of her/his accommodation shall be made to the Vice-President (Academic). The Dean, or the Vice-President (Academic), as the case may be, shall cause to have an investigation conducted and, upon receipt of the report of the investigation, shall either 1) dismiss the allegation on the grounds of insufficient evidence or lack of jurisdiction by the University, or 2) accept that the allegation is founded and seek the agreement of the respondent to a remedy, or 3)

refer the matter to the President. A Dean's dismissal of the allegation may be appealed, within ten working days, to the Vice-President (Academic) who may, in turn, either 1) again dismiss the allegation, or 2) accept that the allegation is founded and propose a remedy to the respondent, or 3) refer the matter to the President. In the case of students in residence, where the original allegation has been made to the Vice-President (Academic) and is dismissed, appeal shall be directly to the President who may either 1) again dismiss the allegation, or 2) accept that the allegation is founded and propose a remedy to the respondent, or 3) refer the matter to a tribunal appointed by the Senate.

2. in the instance where the matter has been referred to the President, the latter shall decide whether or not the University shall conduct a hearing before a tribunal appointed by the Senate.

If the allegation is proven, the tribunal shall decide upon one of the following sanctions:

The student may be:

a) expelled;

b) suspended for a period of time from all studies at the University;

c) restricted in his/her use of University facilities; and/or

d) given a reprimand.

Should the President decide not to conduct a hearing before a tribunal, the allegation shall be deemed to have been dismissed, but the President shall give written reasons for such a decision, and these reasons shall be communicated to the parties involved.

3. in the instance where the complainant wants redress from the University without the involvement of the respondent, or where the respondent is unknown or is not a member of the University community, and/or where there is a claim that the University has failed or has been negligent in providing a safe, non-hostile environment, the allegation of an offence shall be made in writing to the President, who shall cause an investigation to be conducted. Upon receipt of the report of the investigation, the President may order any relief he/she deems fit, and shall give written reasons for the decision; which reasons shall be communicated to the complainant.

Information about procedure governing tribunals is available from the Clerk of Senate, 607 Robertson Hall.

16. Appeals and Petitions

16.1 Criteria and Procedures

Assuming that a graduate student has exhausted all avenues of appeal and petition with the Dean of the Faculty of Graduate Studies and Research (questions regarding the appeals process can be directed to the Office of the Dean at (613) 520-2518), a graduate student may appeal the decision of the University to deny the award of degree or the required withdrawal of the student to the Senate upon certain specific grounds.

Such grounds are the allegation by the student that the student has been denied a degree or forced to withdraw because of some mistake, error, or improper conduct by the University, its officers, or employees.

A graduate student may petition the Senate to grant a degree or to stay a decision of required withdrawal on compassionate grounds.

Such appeals and petitions must be submitted in writing, within ninety days of receipt by the student of the decision which is to be appealed or petitioned, to the Clerk of the Senate, Room 607, Robertson Hall.

17. Graduation

17.1 Conferring of Degrees

On the recommendation of the Faculty of Graduate Studies and Research and with the approval of the Senate of the University, degrees are conferred by the Chancellor in the spring and fall of each year.

17.2 Application Deadlines

Candidates may have their degrees certified in February each year; they must apply by December 1. Students expecting to graduate at the Spring Convocation must apply for graduation in the Graduate Studies and Research office by February 1. Those expecting to graduate at the Fall Convocation must apply by September 1.

18. Engineering

In addition to University and Graduate Faculty Regulations, all Engineering departments share the following procedures.

Programs of study are offered by the Faculty of Engineering leading to the degrees of Master of Engineering and Doctor of Philosophy in Aerospace, Civil, Electrical, Environmental and Mechanical Engineering; to the degree of Master of Engineering in Materials Engineering, and Telecommunications Technology Management; to the degree of Master of Applied Science, and, in cooperation with the Faculty of Science,

to the degree of Master of Science in Information and Systems Science.

Most graduate programs in the engineering departments at Carleton University and the University of Ottawa are administered through joint institutes in three engineering disciplines. The Ottawa-Carleton Institute for Electrical and Computer Engineering was established in 1983; for Mechanical and Aerospace Engineering in 1984; and for Civil Engineering in 1984. Each of these institutes combines the research strengths and resources of departments of engineering at Carleton University and at the University of Ottawa, and provides a framework for interaction. The institutes are also concerned with applications for graduate programs and graduate course offerings.

Programs leading to master's and Ph.D. degrees are available through the institutes in a wide range of sub-disciplines in each department.

The areas of current research, the research facilities available, and the graduate courses offered are given in the following pages for the four departments of the faculty:

- Civil and Environmental Engineering
- Electronics
- Mechanical and Aerospace Engineering
- Systems and Computer Engineering

Both the master's and Ph.D. programs may be undertaken on a full-time or part-time basis.

General information on awards and financial assistance is given in that section of this Calendar.

A limited number of students who are not degree candidates may be admitted to each graduate engineering course. Credit earned as a special student normally cannot be credited towards a graduate degree in engineering.

18.1 Computing Facilities

Computing facilities available to engineering students include the university's central Honeywell mainframes with time-sharing terminals. In addition, two VAX minicomputers, numerous SGI, SUN, and Apollo workstations, and many microcomputers reside in the engineering departments. Several other computers within the Faculty are in use for data acquisition and specific research projects.

18.2 Research in an Outside Institution

A student may apply for permission to carry out his/her research, in part or whole, in an outside institution (for example, industrial, governmental, or university laboratory). Such an application, addressed to the Dean of the

Faculty of Graduate Studies and Research through the Dean of Engineering and Design, should:

- Include a detailed statement of the research proposal, of arrangements for supervision, and of the circumstances under which it is to be carried out

- Establish that the applicant will be able to pursue independent research

- State the facilities available for the research

- Include a proposed time schedule

- Be accompanied by a supporting letter from a responsible person in the outside institution giving approval of the proposal and accepting these regulations

18.3 Part-time Thesis Research

A part-time research program may be permitted if the conditions for the "presence" of the student (outlined under faculty regulations) are satisfied. It is the responsibility of the research supervisor to define the fraction of full-time research engaged upon by the student so that this can appropriately be credited to his/her program and assessed for payment of tuition fees. Before permission to undertake research on a part-time basis can be granted, the student must submit in writing, to the Dean of the Faculty of Graduate Studies and Research through the Dean of Engineering and Design, a statement of his/her proposed manner of working part time, supported by a letter of approval from his/her employer.

18.4 Waiver of Thesis

A candidate for the master's degree who has, before admission, completed independent research or development projects of an adequate level of accomplishment, may apply to the chair of the department concerned for a waiver of the thesis requirement. Such application must be made at the time of initial registration, and must be supported by copies of published reports describing the work. If the application is approved, the candidate must complete ten 0.5 credits, six of which must be graduate-level courses in engineering, to fulfil the requirement for the award of a degree without a thesis. A candidate who has been granted a waiver of the thesis requirement may be required to take an oral examination on the subject of one of his/her published papers and topics related to his/her field of specialization.

18.5 Transfer of Credit

Normally, 1.0 credit completed at another university may be accepted in partial fulfillment of degree requirements, provided that the course is appropriate to the candidate's program

at Carleton University. Under special circumstances, a second 1.0 credit may be allowed. Refer to Section 6 of the General Regulations section of this Calendar for details of the rules governing transfer of credit.

18.6 Transfer from Master's to Ph.D. Program

A student who shows outstanding academic performance and demonstrates high promise for advanced research during the full-time master's program at Carleton University may, subject to meeting the requirements below, and with the approval of the admissions committee of the joint institute administering his/her graduate program, be permitted to transfer into the Ph.D. program without receiving the master's degree. Such a student must complete the course requirements and thesis registration requirements of the master's program, but is exempted from submission of the thesis.

A student wishing to transfer should apply to the chair of his/her department. If the department and the Faculty of Graduate Studies and Research approve the application, the candidate will be required to take the comprehensive examination for the Ph.D. The requirements for the comprehensive examination will include the submission of a report on research to date, and a research proposal for the Ph.D.

After successfully passing the comprehensive examination, the student will be admitted to the Ph.D. program with normal program requirements (but with the comprehensive examination to his/her credit). If unsuccessful, he/she will remain in the master's program and be required to submit the thesis in the usual way.

18.7 Faculty Regulations

Graduate students in the Faculty of Engineering are governed by the section of this Calendar entitled General Regulations, and by the regulations stated in this section.

All graduate students in the Faculty of Engineering must obtain satisfactory grades in their course work, must make satisfactory progress in their research if a thesis is included in their program, and must satisfy the following criteria of activity or "presence" in the program:

- Maintain a close working relationship with their research supervisor

- Attend the courses for which they are registered

- Submit written reports and present seminars as required by their supervisor

- Attend departmental seminars held regularly to discuss current research and related topics. Each student is required from time to time to present a seminar on his/her research; part-

time students who are not actively engaged in research are exempt from the seminar requirement

- Be readily available on an informal basis

18.8 Thesis Regulations

The thesis must represent the result of the candidate's independent research or development work, undertaken after admission to graduate studies at Carleton University. Experimental or theoretical results previously published by the candidate may be used only as introductory or background material for the thesis. A candidate may be permitted to carry on thesis research work off campus, provided the work is approved in advance, and arrangements have been made for supervision of thesis research activities by a faculty member of Carleton University. A part-time student may use the Faculty of Engineering laboratory facilities for on-campus thesis research and development activities.

Each candidate submitting a thesis will be required to undertake an oral examination on the subject of the thesis and related fields.

18.9 Registration and Course Selection

- Undergraduate engineering courses may not normally be taken for credit.

- All students require departmental approval for their program of studies, for course registration, and for any changes to their status or program.

- Each full-time student is required, in any fall or winter program requirements of three or more 0.5 credit courses, to register for credit in at least three 0.5 credit courses. After the last day for withdrawal from courses in each such term, the student must remain registered in at least three 0.5 credit courses.

- For part-time students, the department will arrange the appropriate course load and selection.

18.10 Masters Degrees in Engineering

Admission Requirements

Applicants are admitted under the general regulations specified in this Calendar, but, in addition, are required to have strong undergraduate preparation in the appropriate engineering disciplines, computer programming, mathematics, and physics.

Program Requirements

Two alternatives are available for full-time students studying towards the degree of Master of Engineering, one involving a thesis plus course

work (M.A.Sc.), the other involving course work only (M.Eng.). The choice of these alternatives must be arranged and approved at the time of admission into the program. Students are encouraged to take at least 0.5 credit outside of their department.

M.A.Sc. by Thesis

- A thesis based on the student's research

- A minimum of 3.0 credits in engineering or a related discipline. The number of credits required by each department is specified in its section of this Calendar

M.Eng. by Course Work

Specific program requirements are detailed in the departmental sections of this Calendar.

18.11 Ph.D. In Engineering

Admission Requirements

For admission to the Ph.D. program, an applicant must normally hold a master's degree in engineering (or its equivalent) and, by his/her previous program of study and scholastic record, demonstrate a capacity for advanced study and research. Experience gained while working in an engineering or research environment will be taken into account when assessing an application. The applicant must specify his/her intended field of research.

Program Requirements

The specific program requirements for the Ph.D. degree are the following:

- A minimum of two calendar years of full-time study (or the equivalent)

- Course requirements as established on admission, but not less than the minimum requirements as stated in each joint program Institute section of this Calendar. Students should note that the minimum number of credits required in the Ph.D. program varies among the joint Institutes. Subject to approval of the student's adviser or advisory committee, the student may take, or be required to take, courses in an appropriate discipline outside the Faculty of Engineering. For information on admission and program requirements see the departmental entries for the Departments of Electronics, Mechanical and Aerospace Engineering, and Systems and Computer Engineering.

- Substantial research

- A thesis on the research

Advisory Committee

An advisory committee with at least three members will be appointed by the department soon after a student's first registration. It has the responsibility of ensuring that conditions for

the pursuit and completion of the student's program are fulfilled, and it reviews his/her program at least once a year.

Comprehensive Examination

The comprehensive examination is held approximately one year after initial registration in the program in the case of full-time students, and at an equivalent time in the case of part-time students. The purpose of the examination is threefold:

• To assess the student's comprehensive knowledge of his/her field of study

• To assess the preparedness and capability of the student for doctoral research

• To judge the suitability of the research topic for a doctoral thesis

The student is required to present his/her research proposal, and to be subjected to oral and written examination in appropriate fields of study. He/she will be informed by the advisory committee of the specific requirements of the examination. Having successfully completed the comprehensive examination, the student becomes a doctoral candidate.

Academic Programs, Units and Courses

- Architecture
- Art History
- Biology, Ottawa-Carleton Institute
- Biostatistics, Collaborative Program
- Business
- Canadian Studies
- Chemistry, Ottawa-Carleton Institute
- Chemical and Environmental Toxicology, Collaborative Program
- Civil and Environmental Engineering
- Civil Engineering, Ottawa-Carleton Institute
- Cognitive Science
- Comparative Literary Studies
- Computer Science
- Computer Science, Ottawa-Carleton Institute
- Cultural Mediations
- Economics
- Electrical and Computer Engineering, Ottawa-Carleton Institute
- Electrical Engineering, University of Ottawa
- Electronics
- English Language and Literature
- Environmental Engineering, Ottawa-Carleton Institute
- European and Russian Studies
- Film Studies
- French
- Geography
- Geoscience, Ottawa-Carleton Centre
- History
- Industrial Design
- Information and Systems Science
- Interdisciplinary Studies
- International Affairs
- Journalism and Communication
- Law
- Linguistics and Applied Language Studies
- Mass Communication
- Mathematics and Statistics, Ottawa-Carleton Institute
- Mechanical and Aerospace Engineering
- Mechanical and Aerospace Engineering, Ottawa-Carleton Institute
- Mechanical Engineering, University of Ottawa
- Music
- Neuroscience
- Philosophy
- Physics, Ottawa-Carleton Institute
- Political Economy
- Political Science
- Psychology
- Public Policy and Administration
- Religion
- Social Work
- Sociology and Anthropology
- Systems and Computer Engineering
- Women's Studies

Architecture

Architecture Building 202
Telephone: (613) 520-2855
Fax: (613) 520-2849
Web site: www.arch.carleton.ca/

The School

Director of the School, Gulzar Haider
Supervisor of Graduate Studies, Stephen Fai

The School of Architecture offers programs of study and research leading to the Master of Architecture Professional degree and a specialized Master of Architecture Post-professional degree.

M.Arch. Professional

The Master of Architecture Professional degree is awarded upon the successful completion of a full two-year program of studies. The program is studio-based with a strong theoretical component, culminating in a two-credit thesis. The thesis is expected to include both a written text and a design component with appropriate modes of two and three-dimensional representation. Candidates should note that only work of the highest caliber will be accepted. It is expected that students will take a minimum of two terms to complete their thesis requirement. Final submission of all thesis work must be in a publishable format.

The Canadian Architectural Certification Board (CACB) recognizes this degree as an academic prerequisite for registration in the Intern Architect Program. Further information on professional registration can be obtained from the CACB or from one of the provincial associations.

M.Arch. Post-Professional

Theoretical Issues in Architecture and Culture

The M.Arch. Post-Professional is a three-term specialized program allowing students with a professional degree in architecture to pursue advanced research at a graduate level. The program is research oriented and culminates with the completion of a thesis. Inter-departmental collaborations are encouraged. Thesis proposals are developed under the tutelage of a prospective thesis supervisor and are expected to address one of the theoretical issues of architecture and culture outlined below. The thesis is expected to include both a written text and appropriate modes of two and three-dimensional representation. Final submission of all thesis work must be in a publishable format.

Please note that the M.Arch. Post-Professional is not recognized by the Canadian Architectural Certification Board as an academic prerequisite

for professional certification. Students wishing to pursue professional studies in architecture are referred to the professional M.Arch. discussed above.

Research into issues of architecture and culture in the post-professional M.Arch. are organized around two areas of inquiry:

1. Architecture and Cultural Diversity

'Architecture and Cultural Diversity' is concerned with the patterns and interrelationships of cultural issues and processes as they are manifest in built form and as they inform architectural design. Current research topics include:

- The History and Theory of Architecture
- Architecture and Urban Issues

For specific areas of faculty research, please consult the School's Web site.

The positioning of these research topics within the broader discourse on the history and theory of architecture is the subject of two core seminars offered consecutively in the fall and winter terms of the first year. The core seminars are supplemented with studies in cultural and architectural history and theory.

2. Design and Technology

Electronic technologies and screen-based interfaces extend and challenge traditional modes of visual expression. Simulated realities, expert systems, electronic modeling, visualization, and CAD applications open infinite possibilities in visual, written, and interactive communications. Moreover, the convergence of data as digital information allows for an unprecedented mixing and integration of media.

'The Design and Technology' area of the program addresses the need to engage technically-advanced tools in design studies and to bring design expertise to bear on new media, interfaces, software and technology products. The design of physical environments has long been the purview of architects; the Design and Technology specialization brings principles of architectural and graphic design to bear on virtual spaces, environments and graphic interfaces.

Qualifying-Year Program

Candidates with deficiencies in certain areas may be required to take additional prescribed courses as prerequisites to their graduate work. Applicants who do not possess a professional degree in Architecture may be required to register in the qualifying-year program (normally 5.0 credits at

the 4000-level). All courses must be approved by the graduate admissions committee of the School in consultation with the Faculty of Graduate Studies and Research. Upon successful completion of these courses, students may be permitted to proceed to the M.Arch. (Design Studies) program.

Admission Requirements

M.Arch. Professional

Students may be admitted to the M.Arch. Professional program following the successful completion of the Bachelor of Architectural Studies (see undergraduate calendar) or a four-year undergraduate degree deemed comparable to the B.A.S. by the School's graduate admissions committee. All applicants are expected to have maintained a minimum academic average of B- in their undergraduate studies. In addition to these academic credentials, applicants must submit for review two examples of academic writing and a portfolio of creative work demonstrating facility in architectural design and methods of representation. Professional experience may be taken into consideration.

Where applicants do not hold a B.A.S. or comparable four-year degree, but hold a four-year undergraduate degree with a concentration in architecture, equivalence may be considered on the basis of a demonstrated, exceptional design ability and high academic standing (B+ minimum average). Applicants are required to submit a complete portfolio of artistic and design work produced during their undergraduate studies and two examples of academic writing. Professional experience also may be taken into consideration.

When professional work is included as part of an applicant's portfolio, a precise description of the applicant's involvement and responsibilities in the completion of the project must be included.

All applicants must provide two confidential letters of reference on the prescribed forms and a statement of academic and professional objectives.

The Faculty of Graduate Studies and Research requires applicants whose native tongue is not English to be tested for proficiency in English, as described in Section 3.6 of the General Regulations of this Calendar. Note, however, that students with a TOEFL score below 600 will not be considered for admission to the M.Arch. Professional.

An admissions committee, which includes the supervisor of graduate studies, will determine the merits of each candidate on the basis of academic record, evidence of visual and architectural design ability, and, where applicable, professional experience. Enrolment is limited. The School's admission policy is governed by the availability of graduate student space. Possession of the minimum academic admission requirement does not, in itself, guarantee admission.

The deadlines for submission of applications for graduate studies (professional) in Architecture are as follows: March 1 for students requesting financial assistance; June 1 for students who are not seeking financial assistance but who are seeking admission in September. Applications are not accepted for admission in January.

M.Arch. Post-Professional

Students are admitted to the post-professional stream of the M.Arch. program on the basis of a first professional degree in architecture with evidence of undergraduate studies in the humanities and/or social sciences. Students are expected to have maintained a minimum academic average of B-. In addition to these academic credentials, applicants must submit for review two examples of academic writing and a portfolio of creative work demonstrating facility in architectural design and methods of representation. Professional experience may also be taken into consideration.

Where applicants do not hold a professional degree in architecture but possess either a professional degree in a related design discipline or an Honours B.A. in Fine Arts or the Humanities, equivalence will be considered on the basis of a demonstrated, exceptional design ability and a high academic standing (B+ minimum average). Applicants are required to submit a complete portfolio of artistic and design work produced during their undergraduate education and two examples of academic writing. Professional experience may also be taken into consideration.

All applicants must provide two confidential letters of reference on the prescribed forms and a statement of academic and professional objectives.

An admissions committee, which includes the supervisor of graduate studies, will determine the merits of each candidate on the basis of academic record, evidence of visual and architectural design ability, and, where applicable, professional experience. Enrolment is limited. The School's admission policy is governed by the availability of graduate space. Possession of the minimum admission requirements does not, in itself, guarantee acceptance.

The Faculty of Graduate Studies and Research requires applicants whose native tongue is not English to be tested for proficiency in English, as described in Section 3.6 of the general regulations. Note, however, that students with a TOEFL score below 600 will not be considered for admission to the professional M.Arch.

The deadlines for submission of applications for graduate studies (post-professional) in Architecture are as follows: March 1 for students requesting financial assistance; June 1 for students who are not seeking financial assistance but who are seeking admission in September; October 1 for students who are seeking admission in January.

Program Requirements

M.Arch. Professional
General requirements:

- 2.0 core course credits
- 1.0 elective course credits
- 3.0 studio credits
- 2.0-credit thesis which must be defended at an oral examination

A list of approved electives is available from the Graduate Administrator at the School of Architecture. All non-core courses must be approved by the Supervisor of Graduate Studies.

Specific requirements:

Year 1
Fall Term: ARCH 5200, ARCC 5100, ARCS 5105

Winter Term ARCH 5201, ARCU 4200 or 0.5 credit elective**, ARCS 5106

Year 2
Fall Term 0.5 credit elective**, ARCS 5909***

Winter Term ARCU 4200* or 0.5 credit elective**, ARCS 5909***

*ARCU 4200 is a core course. It can be taken in the winter term of either year 1 or year 2.

** An advanced course at the 4000-level or above, chosen from a selected list of approved electives.

*** ARCS 5909 is expected to extend over two terms. By the end of the first term of thesis registration, students will submit a report for which an interim grade will be awarded. This report will follow guidelines prescribed by the Supervisor of Graduate Studies.

M.Arch. Post-Professional
1. Architecture and Cultural Diversity

General requirements:

- 1.5 core course credits
- 1.5 elective course credits
- 2.0-credit thesis which must be defended at an oral examination

A list of approved electives is available from the Graduate Administrator at the School of Architecture. All non-core courses must be approved by the Supervisor of Graduate Studies.

Specific requirements:

- ARCH 5001 (0.5 credit)
- ARCH 5002 (0.5 credit)
- ARCH 5003 (0.5 credit)
- 0.5 credit in the area of architectural theory (an advanced course at the 4000-level in the theory of architecture offered by the school of architecture)
- 0.5 credit in the area of cultural theory at the 5000-level or above in the general field of cultural theory
- 0.5 credit elective chosen from an approved list of courses in the area of cultural studies, cultural theory, cultural production, the built environment and related subjects.
- ARCH 5909 (2.0-credit thesis)

The program is normally completed in three terms of full-time study.

2. Design and Technology

General requirements:

- 2.5 core course credits
- 0.5 elective credits
- 2.0-credit thesis which must be defended at an oral examination

A list of approved electives is available from the Graduate Administrator at the School of Architecture. All non-core courses must be approved by the Supervisor of Graduate Studies.

Specific requirements

- ARCC 5001 (0.5 credit)
- ARCC 5002 (0.5 credit)
- ARCN 5101 (1.0 credit)
- ARCN 5102 (0.5 credit)
- 0.5 credit elective chosen from an approved list of courses in the area of culture and technology at the 4000-level or as approved by the Graduate Supervisor.
- ARCC 5909 (2.0-credit thesis)

The program is normally completed in three terms of full-time study.

Academic Regulations

See the General Regulations section of this Calendar.

Graduate Courses

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the **Registration Instructions and Class Schedule** booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Qualified students in other departments may, with permission of the School, enrol in ARCH 5001, ARCH 5002, ARCH 5003, ARCC 5001, ARCC 5002, ARCN 5101 and ARCN 5102.

ARCH 5001 [0.5 credit] (formerly 76.501)
Architecture Seminar 1
An introduction to the intellectual frameworks connecting design and culture as manifest in theories of culture and architecture. The seminar builds on previous undergraduate studies, and is not as an introduction to these fields. The field of inquiry is both historical and contemporary.

ARCH 5002 [0.5 credit] (formerly 76.502)
Architecture Seminar II
A continuation of ARCH 5001, this seminar follows the same general description, but concentrates more on architectural design, on the contemporary condition, and on the ways of thinking that characterize embodiment of cultural content in architecture and other artifacts.

ARCH 5003 [0.5 credit] (formerly 76.503)
Design and Culture Workshop
The prime objective of the workshop is experimental and provides an opportunity to investigate cultural issues in architectural design. The workshop operates as a directed study with specific content, objectives, and scheduling arranged between student and academic advisor.

ARCH 5200 [0.5 credit] (formerly 76.520)
Graduate Seminar 1: Introduction to Critical Thought in Architecture
Introduction to critical theories and research approaches relevant to the field of architecture. Identification of issues through a coordinated series of lectures and readings. Development of analytical and interpretative skills through seminar discussions and writing culminating in a scholarly position paper by the student.

ARCH 5201 [0.5 credit] (formerly 76.521)
Graduate Seminar 2: Contemporary Theoretical Perspectives in Architecture
Lectures, readings, and case studies on contemporary issues in architecture and allied fields of study. Critical analysis of current trends and possibilities set against traditional modes of architectural thought and practice. This course serves as a forum for a preliminary articulation of the thesis proposal.

ARCH 5909 [2.0 credits] (formerly 76.599)
M.Arch. Post-Professional Thesis (Architecture and Cultural Diversity)
A scholarly, written thesis supported by appropriate methods of two and three-dimensional representation. Research undertaken by the student is expected to engage one of the research topics outlined above. Documentation must be in a publishable format. All proposals must be approved by the graduate committee of the School of Architecture.

ARCC 5001 [0.5 credit] (formerly 77. 501)
Introduction to Design and Multimedia
An introduction to the broad field of multimedia and interactive design as it relates to architecture and the general field of design. Special topics include virtual environments, user interface in software, Web and product design, perceptual and cognitive science, navigation, film/video and sound editing and animation technologies.

ARCC 5002 [0.5 credit] (formerly 77. 502)
Topics in Design and Multimedia: Information Architecture and the World Wide Web
An introduction to to the to the design of Web-based applications, focusing on process, site architecture, usability testing, and Web functionality. Students synthesize and customize various software applications in the production of a major Web-based project, incorporating both client and server-side functionality. Students are introduced to relational database design, JavaScript, cgi scripts, and "middleware" products such as WebObjects and ColdFusion.

ARCC 5100 [0.5 credit] (formerly 77. 510)
Advanced Building Systems
This course will introduce advanced design in building technology and systems integration. Leading edge building materials, technologies and philosophies will be explored through intensive case study research and analysis, comparing, and critically evaluating, traditional methods with current computer modeling and analysis techniques.

ARCC 5909 [2.0 credits] (formerly 77. 599)
M.Arch. Post-professional Thesis (Design and Technology)
Basic or applied research in architectural, industrial, and digital design. Areas include interactive education/training, product/interface design, programming/scripting, culture/technology, or research as defined by the student. Documentation must be in a publishable format. Topics must be approved by the graduate committee of the School of Architecture.

ARCU 4200 [0.5 credit] (formerly 78.420)
Introduction to Professional Practice
The practice of architecture. Professional organization and conduct, the architect's services, business law, office organization and management, contract documents, building

codes, contract management, cost control, accounting and site supervision. Guest speakers and case studies.

ARCN 5101 [1.0 credit] (formerly 79.511)
Interactive Design Workshop I
An intensive introduction to the design of interactive environments. Students learn, use and evaluate a range of multimedia software including Adobe Photoshop, Illustrator, Premiere, Macromedia, Dreamweaver, Fireworks, Director, 3D Modeling programs, and sound editing. Basic design, graphic design, and software literacy are emphasized. The course includes presentations by design professionals working in the field.

ARCN 5102 [1.0 credit] (formerly 79.512)
Interactive Design Workshop II
An introduction to the logistic aspects of producing multimedia products with an emphasis on usability testing and user interface design. Topics include: storyboarding and graphic design, instructional design, rapid prototyping, project streaming, management and marketing, technical writing and product evaluation. Organized as a seminar. Work is done in teams.

ARCS 5105 [0.5 credit] (formerly 80.515)
Graduate Studio 1
An architectural investigation within a contemporary urban setting, usually dealing with central-city sites and complex programs. Projects address the question of urban architecture both from practical and theoretical perspectives. Architecturally relevant building technology and systems will be introduced in the Studio as required.

ARCS 5106 [0.5 credit] (formerly 80.516)
Graduate Studio 2
The design of a large-scale and culturally significant building project, set within a prominent urban or natural landscape. Integrated resolution of the combined issue of site, program, and expression is expected. Architecturally relevant building technology and systems will be introduced in the Studio as required.

ARCS 5909 [1.0 credit] (formerly 80.599)
M.Arch. Professional Thesis
Student-initiated design investigation, developed in association with a thesis supervisor, supported by written text and appropriate methods of two and three- dimensional representation. Documentation must be in a publishable format. All proposals must be approved by the graduate committee of the School of Architecture.

Other Course Offerings

The School offers graduate-level courses that can be used towards degree programs in the Faculty of Engineering, the School of Canadian Studies, and the Faculty of Public Affairs and Management at Carleton University. In addition, there is an understanding with the Faculty of Environmental Studies at York University, the Centre for Building Studies at Concordia University, and the Faculté de l'Aménagement at the Université de Montréal, recognizing graduate course work undertaken at Carleton University's School of Architecture. Members of the School may also supervise graduate research at these institutions.

Faculty interest and expertise lie in the following areas:

History and Theory of Architecture

Scholarly studies in architectural thought of late antiquity, early Christianity, the Renaissance, baroque, the modern movement, post-modernism, as well as Canadian Architecture and the architecture of Islam.

Architecture and Society

Ethnicity, multiculturalism and architectural expression; international development and indigenous architecture; heritage and preservation; evolution of the architectural profession.

Architecture and Technology

Building envelope and construction detail; design economics; structures; energy; lighting; acoustics; integration of systems.

Architecture and the City

Urban morphologies, architectural content of urban planning and design; social, cultural, economic, and political matrix in the urban society and the contemporary architectural reality.

Computer-Aided Design and Management

Design and modeling, visual communication, computer graphics; computers and architectural practice.

Architecture and Morphology

Studies in form, space, structure, and order; geometric and symbolic orders in architecture.

Design/Build

Applied architectural research, prototype development.

The following courses are available to students from other departments who hold an honours degree or equivalent in a related academic discipline. Permission of the School is required for registration.

ARCH 5000 [0.5 credit] (formerly 76.500)
Directed Studies in History and Theory of Architecture
Reading and research tutorials.

ARCH 5100 [0.5 credit] (formerly 76.510)
Directed Studies in Architecture and Society
Reading and research tutorials.

ARCC 5000 [0.5 credit] (formerly 77.500)
Directed Studies in Architecture and Technology
Reading and research tutorials.

ARCC 5401 [0.5 credit] (formerly 77.541)
Workshop: Technical Studies in Heritage Conservation
(Also listed as Canadian Studies 12.541)

ARCU 5000 [0.5 credit] (formerly 78.500)
Directed Studies in Architecture and the City
Reading and research tutorials.

ARCU 5402 [0.5 credit] (formerly 78.542)
Workshop: Urban Studies in Heritage Conservation
(Also listed as Canadian Studies 12.542)

ARCN 5000 [0.5 credit] (formerly 79.500)
Directed Studies in Computer-Aided Design
Reading and research tutorials.

ARCN 5001 [0.5 credit] (formerly 79.501)
Directed Studies in Architecture and Morphology
Reading and research tutorials.

School for Studies in Art and Culture: Art History

St. Patrick's Building 423
Telephone: (613) 520-2342
Fax: (613) 520-3575

Web site: www.carleton.ca/artandculture/art_history.html

The School

Director, Bryan Gillingham

Supervisor of Graduate Studies, Carol Payne

The School for Studies in Art and Culture offers a program of study and research leading to the degree of Master of Arts in Canadian Art History. The program is unique in its breadth and comprehensiveness. Students can choose to focus on art and architecture drawn from Canada's wealth of different artistic communities, including the traditions of Euro-Canadians, aboriginal peoples, other ethnic groups, and women. They are encouraged to consider these traditions as aesthetic expressions and within broad contexts of race and gender and of social, political, and economic history.

Qualifying-Year Program

Applicants who do not qualify for direct admission to the master's program may be admitted to a qualifying-year program. Applicants who lack an Honours degree, but have a 3-year degree with an honours standing (at least B overall) will normally be admitted to a qualifying-year program. Refer to the General Regulations section of this Calendar.

Master of Arts

Admission Requirements

The minimum requirement for admission to the master's program is an Honours bachelor's degree (or the equivalent) in art history or a related discipline, with at least high honours standing. Related disciplines may include anthropology, Canadian history, and Canadian studies. Applicants without a background in art history may be required to take up to a maximum of 2.0 credits in certain designated courses from the undergraduate art history program in addition to their regular program.

Program Requirements

The specific program requirements for students in the M.A. program are as follows:

- ARTH 5000 (1.0 credit)
- 2.0 credits with a minimum of 1.5 to be taken from the following artistic traditions: Euro-American, First Nations, Inuit art, architecture, photography, folk and popular arts. 0.5

credits must be taken in a tradition other than your thesis area of study.

- ARTH 5909 (2.0 credits)

Subject to the approval of the graduate supervisor, 0.5 credit may be taken outside the Art History program. A maximum of 1.0 credit may be selected from course offerings at the 4000-level in Art History.

The student's program will be developed in consultation with the graduate supervisor and graduate faculty of Art History, and must be approved by the graduate supervisor. The prescribed program will take into account the student's background and special interests, as well as the research strengths of the Art History graduate faculty.

Deadlines

Thesis Proposal
Full-time students normally will submit their thesis topic to the thesis proposal board no later than April 15 of the first year of registration for students enrolled full-time, and no later than the middle of the fifth term of registration for students enrolled part-time.

Thesis
Regulations governing requirements for the master's thesis, including deadlines for submission, are outlined in the General Regulations section of this Calendar.

Language Requirements

Students are required to demonstrate a reading knowledge of French (or another language to be approved by the Art History graduate supervisor).

Academic Standing

A standing of B- or better must be obtained in each credit counted towards the master's degree.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton

course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

ARTH 5000 [1.0 credit] (formerly 11.500)
The Practice of Canadian Art History
Examination of the historiography of native and non-native Canadian art history; history and practice of collecting institutions, including contemporary theoretical approaches; cross-cultural and multi-cultural aspects of contemporary art, with on-site research in the major collecting institutions of the National Capital Region.

ARTH 5001 [0.5 credit] (formerly 11.501)
Graduate Practicum
Practical on-site work in the collecting institutions of the National Capital Region (as available), including a written assignment. The practicum coordinator and the on-site supervisor jointly determine the final mark. A maximum of 1.0 practicum credit may be applied towards degree requirements.

ARTH 5002 [0.5 credit] (formerly 11.502)
Directed Readings and Research
Students may pursue topics in Canadian art, which they have selected in consultation with the graduate faculty of the program.

ARTH 5101 [0.5 credit] (formerly 11.511)
Topics in Historical Canadian Art
A consideration of social, political, and economic contexts of Canadian art in selected periods from French settlement to 1900. Emphasis will be placed on the transformation of European traditions by artists and sculptors and on the impact of Canada's geographical proximity to the United States.

ARTH 5102 [0.5 credit] (formerly 11.512)
Topics in the History of Art Criticism in Canada
Critical reaction to art exhibitions (historical, modern or contemporary) will be examined with reference to public opinion, critical methodology, and aesthetic attitudes.

ARTH 5104 [0.5 credit] (formerly 11.514)
Canadian Women Artists: Between the World Wars
An examination of art by women in light of the role played by architects, painters, sculptors, printmakers and photographers in the formation of artists' groups, in the development of modernist art and in the production of commissioned works of art which served as Canadian civic and/or national symbols.

ARTH 5105 [0.5 credit] (formerly 11.515)
Reading Modernism and Post-Modernism in Canada
An examination of writings on Canadian modernist and post-modernist art by artists and critics in light of current concerns about audience response and reception theory.

ARTH 5106 [0.5 credit] (formerly 11.516)
Contemporary Women Artists - 1970 to the Present: Vision and Difference
An inquiry into the art of contemporary women artists in the context of cultural, social/political and feminist issues. Examination of patronage systems, viewer response and contemporary art theory will provide additional foci for the discussion of gender and contemporary art-making.

ARTH 5107 [0.5 credit] (formerly 11.517)
Public Art in Canada: Issues and Realities
An examination of works of art commissioned for public spaces. Emphasis is placed on analysis of the art and the interrelationships among the artist, the architect, the patron, the critic and the public. Consideration is also given to social, cultural and political contexts.

ARTH 5109 [0.5 credit] (formerly 11.519)
Aspects of Contemporary Art Practice
Examination of contemporary art practice in Canada, including the artist collective, traditional and new media (painting, sculpture, installation, video, computer art), the relationship of artist and society, critical and public reception of contemporary art, as well as interaction between institutional collecting and artist-run centres.

ARTH 5200 [0.5 credit] (formerly 11.520)
Art of the Aboriginal Peoples
An examination of the creative production and aesthetic culture of selected First Nations in pre-contact and historic times through the early twentieth century, drawing on postcolonial and critical theory.

ARTH 5204 [0.5 credit] (formerly 11.524)
Issues in Contemporary Aboriginal Art
A study of selected aspects of contemporary aboriginal art in Canada, focusing on the period since 1960. Current debates about museum representation, appropriation, and marginalization will also be discussed.

ARTH 5207 [0.5 credit] (formerly 11.527)
Creating an Exhibition
Students curate an exhibition of Canadian works for a museum or gallery in the Ottawa region, under guidance from museum professionals, who instruct in curatorial practice, from the development of an exhibition concept, selection and research of works, writing texts and designing the installation.

ARTH 5208 [0.5 credit] (formerly 11.528)
Museum Studies and Curatorial Practice: Theory and Practice
A seminar realizing an exhibition of Canadian art (Aboriginal and/or non-Aboriginal) to be presented at the Carleton University Art Gallery. This will involve conceptualization, research, selection, cataloguing, labeling, promotion, contextualization, and evaluation using the collections of the Gallery.

ARTH 5303 [0.5 credit] (formerly 11.533)
Topics in Inuit Art
Selected topics in the historical development
and significance of Canadian Inuit art in the
broad context of world art may include such
broad themes as historiography, cross-cultural
aesthetics, and the relationship of Inuit art to
contemporary critical and social theory.

ARTH 5402 [0.5 credit] (formerly 11.542)
**The Archive in Canadian Art and
Architecture: Theory and Practice**
An introduction to diverse aspects of 'The
Archive' that may include theoretical
perspectives, access to specialized archival
collections, research applications and
interrelationships between art, artifact and
architectural practices.

ARTH 5403 [0.5 credit] (formerly 11.543)
**Topics in Canadian Historical and
Contemporary Architecture: Theory and
Practice**
Specialized topics examine theory and practice
of Canadian architects, architectural historians
and critics from historical and contemporary
perspectives.

ARTH 5500 [0.5 credit] (formerly 11.550)
Issues in Canadian Photography
Examination of photographic practice and
reception in Canada. Emphasis will be placed
on social, political and cultural contexts as well
also on theoretical approaches to the study of
photographs.

ARTH 5600 [0.5 credit] (formerly 11.560)
**Canadian Folk and Popular Arts: Sources
and Styles**
An investigation into folk and popular arts in
North America with a special emphasis on
Canada. Among the issues to be considered
are: the role of community-based artistic
traditions, the discourse surrounding folk art,
the influence of the market, social context, and
style.

ARTH 5909 (formerly 11.599)
M.A. Thesis

Ottawa-Carleton Institute of Biology

Université d'Ottawa
University of Ottawa
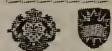
Carleton University

2240 Herzberg Building
Telephone: (613) 520-2600, ext. 8769
Fax: (613) 520-5613

The Institute

Director of the Institute, D.A. Johnson

Associate Director, M. Forbes

Students pursuing studies in biological sciences at the M.Sc. and Ph.D. levels in the Ottawa area do so in a co-operative program that combines the resources of the Departments of Biology of Carleton University and the University of Ottawa. The two universities have a joint committee supervising the programs, regulations, and student admissions.

Students are admitted for graduate work under the general regulations of the Institute. Additional criteria for admission include academic performance, research experience, and referees' appraisals. The student must also be accepted by a faculty member who will supervise the research project, and the choice of supervisor will determine the primary campus location of the student. The student's advisory committee will normally include faculty members from both universities.

Requests for information and completed applications should be sent to the Director or Associate Director of the Institute. Additional information may also be obtained through the Institute Web site, at: www.carleton.ca/~jhelava/biology/biology.html.

Members of the Institute

- J.T. Arnason, *Biochemical Ecology*
- J.M. Blais, *Bio-geochemistry of Toxic Substances*
- L. Bonen, *Molecular Biology*
- C. Boutin, *Agro-ecosystems, plant conservation, wildlife habitat, herbicides, biodiversity*
- S. J. Brooks, *Animal Biochemistry*
- D.L. Brown, *Cell Biology*
- M.J. Canny, *Whole Plant Physiology*
- N. Cappuccino, *Population and Community Ecology*
- G.R. Carmody, *Population Genetics*
- P.M. Catling, *Plant Biosystematics*
- N. Chaly, *Cell Biology*
- F. Chapleau, *Fish Evolution*
- C. Charest, *Plant Physiology*
- J.J. Cheetham, *Membrane Biochemistry*
- R.L. Charlebois, *Molecular Microbiology*
- D.J. Currie, *Macroecology, Biogeography*
- J.R. Dillon, *Molecular Genetics*
- G. Drouin, *Molecular Genetics*
- L. Fahrig, *Population Ecology and Ecological Modeling*
- J.C. Fenwick, *Comparative Endocrinology*
- C.S. Findlay, *Evolution*
- M.R. Forbes, *Evolutionary Ecology*
- R.M. Fourney, *DNA Forensics*
- K. Freemark, *Ecology, Behaviour and Systematics*
- A.J. Gaston, *Conservation Biology*
- K.M. Gilmour, *Comparative Respiratory Physiology*
- L. Gillespie, *Systematics and Evolution of Flowering Plants*
- W.D. Gould, *Biotechnology*
- D.A. Hickey, *Genetics and Bioinformatics*
- J.G. Houseman, *Insect Physiology*
- B. Johnson, *Cell Biochemistry*
- D.A. Johnson, *Molecular Biology*
- S. W. Kennedy, *Environmental Toxicology*
- I. Lambert, *Molecular Biology and Genetic Toxicology*
- D.R.S. Lean, *Ecotoxicology*
- C. Martin, *Development Genetics*
- M.E. McCully, *Plant Ultrastructure and Development*
- B.L.A. Miki, *Plant Molecular Biology*
- P. Mineau, *Ecotoxicology*
- R.E.J. Mitchel, *Radiobiology*
- T.W. Moon, *Comparative Physiology and Biochemistry*
- A. Morin, *Freshwater Ecology*
- M. Paulin-Levasseur, *Cell Biology*
- S.B. Peck, *Arthropod and Beetle Evolution Systematics*

- S.F. Perry, *Comparative Respiratory Physiology*
- B. Philogène, *Ecophysiology of Insects, Chemical Ecology*
- F. Pick, *Aquatic Ecology*
- J. Picman, *Behavioural Ecology*
- S. Regan, *Plant Molecular Biology and Genomics*
- C.B. Renaud, *Fish Biology*
- V.L. Seligy, *Molecular Genetics*
- A. Simons , *Plant life-history evolution*
- J. Sinclair, *Biophysics of Cells*
- M. Smith, *Fungal Molecular Genetics*
- K.B. Storey, *Biochemical Adaptations*
- V. Trudeau, *Comparative Endocrinology*
- J.P. Vierula, *Molecular Biology*
- P.R. Walker, *Molecular Mechanisms of Apoptosis*
- J.-M. Weber, *Metabolic Physiology*
- W.G. Willmore, *Biochemistry, Biotechnology*
- R.C. Wyndham, *Microbial Genetics and Ecology*
- H. Yamazaki, *Bacterial Metabolism, Biotechnology*

Ottawa-Carleton Specialization in Behavioural Neuroscience

The Departments of Biology and Psychology at Carleton University, and the School of Psychology at the University of Ottawa provide a graduate specialization in behavioural neuroscience at the M.Sc. and Ph.D. level. For further details see the Neuroscience program section of this Calendar.

Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology

The Departments of Biology and Chemistry at Carleton University and at the University of Ottawa provide a collaborative program in chemical and environmental toxicology at the M.Sc. level. For further details see the Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology's section of this Calendar.

Each campus is well equipped for a wide range of biological research. Some major equipment and facilities include scanning and transmission electron microscopes; confocal laser scanning microscope; digital light microscope and image analysis facilities; conventional and digital darkrooms; animal and plant growth facilities;

animal cell culture facilities; electro-physiology equipment; computer systems for genomic studies, modeling of ecological systems, and access to the Internet and the Web; DNA and protein analysis facilities, including electrophoresis and chromatographic equipment, and ultra-centrifuges. Students also benefit from the resources of nearby government laboratories and libraries, including Agriculture Canada, Environment Canada, Health and Welfare Canada, and the National Research Council.

Master of Science

Admission Requirements

An Honours B.Sc. or equivalent degree at a standard acceptable to the two universities is required for admission to the M.Sc. program. Applicants with acceptable standing in a non-honours degree may be admitted to a qualifying-year program which will be determined in each case by the admissions committee.

Applicants must demonstrate a fluent knowledge of English (Carleton), or either English or French (Ottawa).

Program Requirements

The M.Sc. degree will be conferred upon a candidate who has fulfilled the following requirements:

- Completion of the advanced courses specified by the admissions committee and the student's advisory committee; these will range from one to three full (two-term) courses, depending on the background and research program of the student. At least one course at the graduate level must be included, and not more than one course at the Fourth-year honours level (completed while registered as a graduate student) may form part of the candidate's course requirements. The passing grade for all required courses is 70% or the equivalent, and the student is not allowed a supplemental examination. Directed studies or reading courses may not make up more than half of the required number of courses. The admissions committee or the student's advisory committee may also direct the student to take or to audit additional courses. Knowledge of a second language may be specified as a requirement.

- Completion of at least two terms as a full-time student resident at one of the two universities is normally required. Programs for part-time students may be arranged.

- Presentation of one public seminar on the candidate's thesis research

- Completion of a thesis incorporating the results of original research carried out under the direct supervision of an approved faculty member

- Successful oral defence of the thesis before an examination board of at least three faculty members, normally drawn from both universities.

Guidelines for Completion of Master's Degree

The maximum time limits for the completion of the requirements of the master's program are listed in in the General Regulations, Section 13 of this Calendar. Full-time candidates in the master's program are expected to complete their degree requirements within six terms of first registration for full-time study. Part-time candidates in the master's program, and candidates who elect to complete their program by a combination of full-time and part-time study, are expected to complete their degree requirements within four calendar years or twelve terms from the initial registration in the master's program.

Doctor of Philosophy

Admission Requirements

An M.Sc. from a recognized university is usually required for entry to the Ph.D. program; however, an applicant with a first class B.Sc. and excellent references may be admitted directly to the Ph.D. program. A student already registered for the M.Sc. may be permitted to transfer to the Ph.D. program following a recommendation by the departmental graduate committee and successful completion of the Qualifying Examination required of Ph.D. candidates.

All applicants must demonstrate a fluent knowledge of English (Carleton), or either English or French (Ottawa).

Program Requirements

The Ph.D. degree will be conferred upon a candidate who has fulfilled the following requirements:

- Completion of the courses at the graduate level specified by the admissions and advisory committees; these will range from one to four full courses (two to six courses if admitted without an M.Sc.), depending on the background and research program of the student. Only graduate courses may form part of the candidate's course requirements. The passing grade for all required courses is 70%, and the student is not allowed a supplemental examination. Directed studies or reading courses may not make up more than half of the required number of courses.

The admissions committee or the student's advisory committee may also direct the student to take or to audit additional courses. Knowledge of a second language may be specified as a requirement.

- Completion of an oral Qualifying Examination within approximately twelve months of entry into the program; this examination will cover the candidate's area of research, and related topics. The format of the examination will be established by the departmental graduate committee and approved by the admissions committee. The examination committee generally will be composed of faculty members of both universities.

- Presentation of at least one public seminar on the candidate's thesis research.

- A thesis incorporating the results of original research carried out under the direct supervision of an approved faculty member.

- Completion of at least four terms as a full-time student resident at one of the two universities (or six terms if admitted without an M.Sc.) is normally required. Under exceptional conditions programs may be arranged for part-time students.

- Successful oral defence of the thesis before an examination board of at least five faculty members, with representation from both universities, and including an external examiner from outside the two universities who is an authority on the thesis research area.

Guidelines for Completion of the Doctoral Degree

The maximum time limits for the completion of the program requirements of the doctoral program are listed in the General Regulations, Section 13 of this Calendar. Full-time candidates in the doctoral program are expected to complete their oral Qualifying Examination within approximately twelve months of entry into the program. Part-time candidates in the doctoral program are expected to complete their oral Qualifying Examination within approximately eighteen months after entry into the program. Full-time candidates are expected to complete their degree requirements within four calendar years or twelve terms of registered full-time study. Doctoral candidates who have transferred from the master's to the doctoral program without completing the master's program are expected to complete their degree requirements within four calendar years or twelve terms of registered full-time study from initial registration in the master's program. Part-time candidates in the doctoral program, and candidates who elect to complete their program by a combination of full- and part-time study, are expected to complete their degree requirements within six calendar years or eighteen terms after the date of initial registration.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at online at: www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable. University of Ottawa course numbers (in parentheses) follow the current Carleton course number and credit information.

BIOL 5001 [0.5 credit] (formerly 61.501) (BIO 5101)
Topics in Biotechnology
A course concerned with the utilization of biological substances and activities of cells, genes, and enzymes in manufacturing, agricultural, and service industries. A different topic will be selected each year.
Prerequisite: A course in cell physiology or biochemistry, or permission of instructor.

BIOL 5003 [0.5 credit] (formerly 61.503) (BIO 5103)
Comparative Biochemistry
Advanced topics emphasizing biochemical structures, functions, and methodologies in the context of animal (invertebrates and vertebrates) adaptations to environmental stress. The course will be offered in alternate years.
Prerequisite: An undergraduate biochemistry course.

BIOL 5009 [0.5 credit] (formerly 61.509) (BIO 8124)
Ontario Vegetation: Patterns, Processes and Protection
Patterns of vegetation and plant species distributions in Ontario will be investigated with respect to their origin and maintaining processes. Current methods of protection of significant and representative vegetation using zonal concepts will be considered.

BIOL 5100 [0.5 credit] (formerly 61.510) (BIO 5301)
Plant Development
An advanced course dealing with selected topics in the experimental study of plant development.

BIOL 5105 [0.5 credit] (formerly 61.515) (BIO 5302)
Methods in Molecular Genetics
The purpose of this course is to review the fundamental theory and techniques in genetic manipulation of prokaryotes and eukaryotes and to examine some of the innovative new strategies being applied to a variety of problems in molecular biology.
Precludes additional credit for BIOL 4106 or BIOL 5107.
Prerequisite: Graduate standing and permission of the Department.

BIOL 5106 [0.5 credit] (formerly 61.516) (BIO 5308)
Laboratory Techniques in Molecular Genetics
This laboratory course, which is complementary to BIOL 5105, is designed to give students practical experience in many of the important techniques in molecular genetics.
Precludes additional credit for BIOL 4109 or BIOL 5107.
Prerequisite: Graduate standing and permission of the Department.

BIOL 5201 [0.5 credit] (formerly 61.521) (BIO 8301)
Evolutionary Genetics and Computer Analyses
Students will learn the basic concepts in molecular evolution and gain hands-on experience with the computer analysis of DNA sequences. Topics covered will include molecular sequence databases, multiple alignments, amino acid and codon usage, molecular clocks, and phylogenetic trees.
Prerequisites: Graduate standing plus basic courses in genetics and evolution; permission of the Department.

BIOL 5202 [0.5 credit] (formerly 61.522) (BIO 8302)
Topics in Evolutionary Genetics
A lecture/seminar course on the genetic mechanisms and forces responsible for variation and evolutionary change in natural populations. Topics to include protein and genome evolution, molecular phylogenies, DNA sequences in population biology, and the evolution of multigene families.
Prerequisites: Graduate standing plus basic courses in genetics and evolution; permission of the Department (Alternate years).

BIOL 5203 [0.5 credit] (formerly 61.523) (BIO 8303)
Techniques of Light Microscopy
An advanced laboratory and lecture course on the principles and techniques of light microscopy.
Precludes additional credit for BIOL 5200 (BIO 8238) (if taken before 1997-98).
Prerequisite: Open to Fourth-year and graduate students with consent of the instructor.

BIOL 5204 [0.5 credit] (formerly 61.524) (BIO 8304)
Techniques of Electron Microscopy
An advanced laboratory and lecture course on the principles and techniques of electron microscopy.

Precludes additional credit for BIOL 5200 (BIO 8238) (if taken before 1997-98).
Prerequisite: Open to Fourth-year and graduate students with permission of the instructor.

BIOL 5205 [1.0 credit] (formerly 61.525)
(BIO 5204)
Plant Physiology and Metabolism
An advanced course dealing with selected topics in plant physiology and plant metabolism.
Prerequisite: Graduate standing or permission of the Department.

BIOL 5304 [1.0 credit] (formerly 61.534)
(PSY 6201)
Basics of Neuroscience
A comprehensive neuroscience course from cellular levels to neural systems and behaviour. Topics covered include aspects of neuroanatomy, neurophysiology, neuropharmacology and behavioural and cognitive neuroscience. (Also listed as PSYC 5200)

BIOL 5306 [0.5 credit] (formerly 61.536)
(BIO 9201)
Photobiology
A course dealing with the interaction between light and living organisms, including an introduction to photochemistry, and a detailed study of photosynthesis, vision, photosensitivity, and photoperiodism.
Prerequisite: An advanced course in animal or plant physiology or biochemistry, or permission of the Department.

BIOL 5307 [0.5 credit] (formerly 61.537)
(BIO 8122)
Advanced Insect Physiology
Physiological characteristics of insects.

BIOL 5402 [0.5 credit] (formerly 61.542)
(BIO 8162)
Developmental Endocrinology/Topics in Comparative Endocrinology
A lecture and reading course concerned with classical as well as current topics in the field of comparative endocrinology. Special emphasis is placed on the vertebrates. Offered in alternate years.
Prerequisite: An undergraduate course in endocrinology.

BIOL 5405 [1.0 credit] (formerly 61.545)
(BIO 9202)
Project in Applied Ecology
A course in the form of a special research project in which the student identifies an environmental problem and the corporate or governmental body that has the power to rectify the problem. (Enrolment is limited).

BIOL 5406 [0.5 credit] (formerly 61.546)
(BIO 9303)
Advanced Plant Ecology
Plant population biology, and its usefulness in explaining attributes of plant communities is discussed. During the labs, projects will be carried out to clarify topics such as vegetation classification and competition.

BIOL 5407 [0.5 credit] (formerly 61.547)
(BIO 5305)
Quantitative Ecology
A course on analysis of the distribution and abundance of organisms and of related environmental phenomena.

Prerequisites: Graduate standing, courses in elementary ecology, elementary statistics and biostatistics, and permission of the Department.

BIOL 5409 [0.5 credit] (formerly 61.549)
(BIO 5306)
Mathematical Modeling for Biologists
This course is designed to develop mathematical tools for the modeling of biological processes. The student is taught the necessary mathematics and a computer language, and guidance is given in the choice of simulation of a biological process.

BIOL 5500 [1.0 credit] (formerly 61.550)
(BIO 5207)
Selected Topics
Courses in selected aspects of specialized biological subjects not covered by other graduate courses; course details will be available at registration.

BIOL 5501 [0.5 credit] (formerly 61.551)
(BIO 8100)
Selected Topics in Biology I
Courses in selected aspects of specialized biological subjects not covered by other graduate courses; course details will be available at registration.

BIOL 5502 [0.5 credit] (formerly 61.552)
(BIO 8102)
Selected Topics in Biology II
Courses in selected aspects of specialized biological subjects not covered by other graduate courses; course details will be available at registration.

BIOL 5503 [0.5 credit] (formerly 61.553)
(BIO 5901)
Recent Advances in Biology
A course intended for all first-year graduate students to bring them up to date in the various major areas of biology. The course consists of selected readings, lectures, and invited speakers. The course is graded Satisfactory/Unsatisfactory.

BIOL 5506 [0.5 credit] (formerly 61.556)
(BIO 5213)
Advanced Insect/Animal Systematics
A lecture and seminar course concerning methods, roles and advances in systematics of insects and other animals. One research project required.
Prerequisite: A 4000-level course in identification or classification of insects or other animals.

**BIOL 5508 [0.5 credit] (formerly 61.558)
(BIO 8306)**
Advanced Topics in Ecology I
Lectures, seminars and discussions on current literature on experimental approaches, concepts, and findings in population and community ecology, ecosystem and landscape ecology, and biostatistics. The content complements BIOL 5509 (BIO 8307).
Precludes additional credit for BIOL 5408 (BIO 9200) (if taken before 1997-98).

**BIOL 5509 [0.5 credit] (formerly 61.559)
(BIO 8307)**
Advanced Topics in Ecology II
Lectures, seminars and discussions on current literature on experimental approaches, concepts and findings in population and community ecology, ecosystem and landscape ecology and biostatistics. The content complements BIOL 5508 (BIO 8306).
Precludes additional credit for BIOL 5408 (BIO 9200) (if taken before 1997-98).

**BIOL 5601 [0.5 credit] (formerly 61.561)
(BIO 5161)**
Advanced Topics in Insect Evolution
An exploration of major concepts and questions in insect evolution in the areas of systematics, morphology, the fossil record, biology, and behaviour. The content complements BIOL 5602 (BIO 5162).
Precludes additional credit for BIOL 5600

(BIO 5160).

**BIOL 5602 [0.5 credit] (formerly 61.562)
(BIO 5162)**
Advanced Topics in Insect Evolution
An exploration of major concepts and questions in insect evolution in the areas of systematics, morphology, the fossil record, biology, and behaviour. The content complements BIOL 5601 (BIO 5161).
Precludes additional credit for BIOL 5600 (BIO 5160).

**BIOL 5605 [0.5 credit] (formerly 61.565)
(BIO 5102)**
Field Course
Credit for this 0.5 credit course is based on a total of three weeks of field-course modules, involving one or two weeks of intensive and continuous field work with attendant assignments. For details, see coordinator.

**BIOL 5709 (formerly 61.579)
(BIO 8113)**
Chemical Toxicology
An introduction to modeling chemical hazards and exposures at the cellular level. The properties of toxic substances are compared to the responses of enzymatic systems. These interactions are defined as Quantitative Structure-Activity Relationships and used to interpret hazardous materials under regulations such as WHMIS. (Also listed as CHEM 5709/ CHM 8157)

Prerequisite: BIOL 6402/CHEM 5708 (BIO 9101/ CHM 8156).

**BIOL 5801 [0.5 credit] (formerly 61.581)
(BIO 5105)**
Animal Behaviour
Animal behaviour from an ecological and evolutionary point of view, with additional independent assignments.
Prerequisites: BIOL 3305 and BIOL 3601 or equivalents and registration in a graduate program, or written permission of the Department.

**BIOL 5802 [0.5 credit] (formerly 61.582)
(BIO 8365)**
Advanced Behavioural Ecology I
Recent ideas and research on advanced topics dealing with the evolution of foraging, temporal, spatial, and reproductive strategies are discussed and critically examined. Offered in alternate years.

**BIOL 5909F (formerly 61.599)
M.Sc. Thesis**

**BIOL 6001 [0.5 credit] (formerly 61.601)
(BIO 8109)**
Advanced Molecular Biology I
Recent advances in molecular biology. Topics for discussion may include: DNA structure and function; the organization of the genome; DNA, RNA and protein synthesis; the regulation of gene expression in eukaryotes and prokaryotes. Normally offered in alternate years.

**BIOL 6002 [0.5 credit] (formerly 61.602)
(BIO 8116)**
Advanced Molecular Biology II
Recent advances in molecular biology. Topics for discussion may include: mutagenesis and DNA repair; molecular aspects of gene transfer; recombination and gene arrangement; molecular biology as applied to industrial and medical problems. Normally offered in alternate years.

**BIOL 6201 [0.5 credit] (formerly 61.621)
(BIO 8117)**
Advanced Cell Biology I
Recent advances in cell biology. Topics for discussion may include: the composition, biosynthesis, deployment, three-dimensional organization and functions of the cytoskeleton; cell-substrate attachment; cell motility; transport of organelles and axoplasmic transport; cell surface and extracellular matrix. Normally offered in alternate years.

**BIOL 6202 [0.5 credit] (formerly 61.622)
(BIO 8118)**
Advanced Cell Biology II
Topics for discussion may include: the structure, composition and three-dimensional organization of the nucleus, mechanisms and regulation of genome replication, structure organization of transcription. Nuclear reorganization during gamete development, fertilization, viral infection and the mitotic cell cycle. Normally offered in alternate years.

BIOL 6203 [0.5 credit] (formerly 61.623)
Special Topics in Neuroscience
An in-depth study of current topics in neuroscience. Course content varies yearly and has recently included cognitive neuroscience, neuropharmacology, neurodegeneration, and behavioural medicine. (Also listed as PSYC 6300.)

BIOL 6204 [0.5 credit] (formerly 61.624)
(ANA 7400)
Neuroscience Techniques
Completion of a research project carried out under the supervision of a neuroscience faculty member. The student will learn a new neuroscience technique and apply it to a research objective. May be repeated for different projects. Students must obtain approval from the Director of the Neuroscience Specialization. (Also listed as PSYC 6204.)

BIOL 6205 [0.5 credit] (formerly 61.625)
(BIO 8319)
Advanced Plant Physiology
A lecture and seminar course dealing with selected topics in advanced plant physiology, available only to graduate students.
Prerequisite: BIOL 4209 or equivalent, or permission of the Department.

BIOL 6207 [0.5 credit] (formerly 61.627)
(BIO 8164)
Ion Channels
A lecture and seminar course on the physiological and biophysical characteristics of ion channels. Topics are selected from such areas as: determinants of channel selectivity, conformation changes, gating, excitability methods of studying channels and cellular distribution, modulation and development of channels. Offered in alternate years.

BIOL 6300 [0.5 credit] (formerly 61.630)
(BIO 8320)
Advanced Plant Biochemistry
A lecture and seminar course, available only to graduate students, dealing with selected topics in advanced plant biochemistry.
Prerequisites: BIOL 4205 and BIOL 4206/4207, or permission of the Department.

BIOL 6303 [1.0 credit] (formerly 61.633)
Advanced Seminar in Neuroscience
A seminar focusing on the active research areas and interests of faculty, guest lecturers and graduate students, as well as on current trends in diverse areas of neuroscience. (Also listed as PSYC 6200.)

BIOL 6304 [0.5 credit] (formerly 61.634)
(BIO 8361)
Advanced Topics in Animal Physiology
In-depth study of areas in animal physiology of current research interest.

BIOL 6401 [0.5 credit] (formerly 61.641) or
(BIO 8935)
Recent Advances in Plant Biology
Special topics of current interest.

BIOL 6402 (formerly 61.642)
(BIO 9101)
Principles of Toxicology
This course identifies the basic theorems of toxicology with examples of current research problems. Toxic risk is defined as the product of intensive hazard and extensive exposure. Each factor is assessed in scientific and social contexts and illustrated with many types of experimental material. (Also listed as CHEM 5708/CHM 8156.)

BIOL 6403 (formerly 61.643)
Ecotoxicology
Concepts of ecotoxicology, emphasizing whole ecosystem response to hazardous contaminants. The focus is the impacts of chronic and acute exposure of ecosystems to toxicants, the methods of pesticide, herbicide and pollutant residue analysis and the concept of bound residues. (Also listed as CHEM 5705/CHM 9109.)
Prerequisite: BIOL 6402/CHEM 5708 (BIO 9101/CHM 8156.)

BIOL 6404 [0.5 credit] (formerly 61.644) or
(BIO 8938)
Plant: Animal Interactions
Secondary metabolites of plants and their role as attractants or antifeedants to animals and as allelopathic or antifungal agents. Emphasis is placed on co-evolution of plants and phytophagous organisms such as insects and mammals, and the ecological and physiological dimensions of this relationship. Offered in alternate years.

BIOL 6405 (formerly 61.645)
(BIO 9105)
Seminar in Toxicology
This course introduces the seminar format and involves student, faculty and invited seminar speakers. The student will present a seminar and submit a report on a current topic in toxicology. (Also listed as CHEM 5805/CHM 8167.)

BIOL 6505 [0.5 credit] (formerly 61.655)
(BIO 8108)
Advanced Topics in Development
Recent advances in developmental biology. Topics may include embryonic induction, regulation of morphogenesis and differentiation, mechanisms of regional specification and pattern formation, and developmental genetics. Offered in alternate years.

BIOL 6800 [0.5 credit] (formerly 61.680)
(BIO 8103)
Advanced Behavioural Ecology II
A seminar and laboratory course dealing with current topics in the study of animal behaviour.
Prerequisites: BIOL 5801 or equivalent, or permission of the Department.

BIOL 6909 (formerly 61.699)
Ph.D. Thesis

Ottawa-Carleton Collaborative Program in Biostatistics

Herzberg Physics 4314
Telephone: (613) 520-2152
Fax: (613) 520-3536
E-mail: brichter@math.carleton.ca

The Specialization

Coordinator, Mathematics and Statistics (Carleton University), C.W.L. Garner

Coordinator, Mathematics and Statistics (University of Ottawa), D.R. McDonald

Coordinator, Epidemiology (University of Ottawa), Sankaranarayanan Raman

Biostatistics is an interdisciplinary area of research linking statistics, biology and medicine. This growing area demands knowledge of the theory behind statistical procedures, an ability to put that theory into practice, and an understanding of the areas of application. The applications range from clinical trials to population epidemiology and the development of new procedures.

The Specialization in Biostatistics is intended to prepare a student for a career as a biostatistician in health-related industry, or for a doctoral program in biostatistics. This program takes advantage of several resources particular to the Ottawa area. The Ottawa-Carleton Institute of Mathematics and Statistics offers a strong program in statistics. The Department of Epidemiology and Community Medicine at the University of Ottawa offers a broad range of courses in epidemiology. In addition, there are several research institutes and teaching hospitals in the Ottawa area. These resources provide students with opportunities to develop analytic skills, to interact with practitioners and to work on current research projects in a variety of areas.

The program is administered by a committee of representatives from the primary departments which include: the Department of Epidemiology and Community Medicine at the University of Ottawa, the School of Mathematics and Statistics at Carleton University, and the Department of Mathematics and Statistics at the University of Ottawa.

Members of the Specialization

The home department of each member is indicated by (C) for the School of Mathematics and Statistics, Carleton University; (UO) for the Department of Mathematics and Statistics, University of Ottawa; (EPI) the Department of Epidemiology and Community Medicine, University of Ottawa.

- Mayer Alvo, *Nonparametric Statistics, Sequential Analysis* (UO)

- N.J. Birkett, *Dynamical Systems in Medicine* (EPI)

- Amitava Bose, *Stochastic Modeling, Probability Theory* (C)

- Miklós Csörgó, *Probability and Statistics* (C)

- A.R. Dabrowski, *Invariance Principles, Weakly Dependent Variables* (UO)

- D.A. Dawson, *Stochastic Processes and Probability Theory* (C)

- Roger Herz-Fischler, *History and Sociology of Mathematics* (C)

- G.B. Ivanoff, *Probability, Point Processes, Martingales* (UO)

- Daniel Krewski, *Applied Statistics in Medicine* (C)

- D.R. McDonald, *Applied Probability* (UO)

- I.W. McDowell, *Health and Aging* (EPI)

- S.E. Mills, *Applied Statistics, Statistical Methods, Inference* (C)

- M. Mojirsheibani, *Resampling, Classification and Pattern Recognition* (C)

- R.C. Nair, *Effects of Blood and Plasma Transfusion on Certain Groups* (EPI)

- Sankaranarayanan Raman, *Cancer Tumour Treatment, Analysis and Meta-analysis of Data from Clinical Trials* (EPI)

- J.N.K. Rao, *Sample Surveys Theory and Methods* (C)

- A.K.Md.E. Saleh, *Order Statistics, Mathematical Statistics* (C)

- Iona Schiopu-Kratina, *Probability Theory, Stochastic Processes* (UO)

- Avi Singh, *Longitudinal Time Series and Methods for their Analysis; Categorical-data Time Series* (C - Adjunct)

- R.A. Spasoff, *Analysis of Clinical Trials* (EPI)

- Barbara Szyszkowicz, *Statistics* (C)

- G.A. Wells, *Clinical Trial Design and Analysis* (EPI)

Master of Science Admission Requirements

The Specialization is open to suitable candidates enrolled in a master's program in any of the participating departments. There are two streams to the Specialization.

Students requesting admission through the Department of Epidemiology and Community Medicine will normally have an Honours B.Sc.

with high honours standing (or the equivalent) in health sciences or biology, and strong analytic skills. Students admitted through the Department of Epidemiology and Community Medicine follow a program with an emphasis on population or clinical epidemiology.

Students requesting admission through the Ottawa-Carleton Institute of Mathematics and Statistics, either through the University of Ottawa or Carleton University, will normally have an Honours B.Sc. with high honours standing (or the equivalent) in statistics and experience in the analysis of data. Students in this stream follow a program with an emphasis in clinical trial design or epidemiologic methodology.

Students should normally apply for acceptance in the Specialization in Biostatistics at the same time as they apply for admission into the master's program in Mathematics or Epidemiology. If accepted into the regular program, the student will then be considered by the program coordinators for admission into the Specialization. Students intending to apply for admission to the Specialization should normally contact prospective thesis supervisors before submitting the application and establish a thesis supervisor and research topic.

Program Requirements

In addition to fulfilling the requirements for the master's program of the department in which they are enrolled, all students in the Specialization in Biostatistics must complete one of the two following optional program patterns:

Master's degree by thesis:

- 3.5 credits

- A compulsory 0.5 credit seminar, STAT 5902 (MAT 5992)

- A thesis equivalent to 1.0 credits

Students in the M.Sc. Mathematics program will normally include EPI 5240, EPI 5241, EPI 6178, EPI 6278, MAT 5190 (STAT 5600), MAT 5191 (STAT 5501) and another course from the Department of Mathematics and Statistics at the graduate level.

Students in the M.Sc. Epidemiology program will normally include EPI 5240, EPI 5241, EPI 5330, EPI 6276, plus two approved courses at the graduate level in Mathematics and Statistics, among their courses.

Master's degree by course work:

- 4.5 credits

- A compulsory 0.5 credit seminar, STAT 5902 (MAT 5992)

Students in the M.Sc. Mathematics program will normally include EPI 5240, EPI 5241, EPI 6178, EPI 6278, MAT 5190 (STAT 5600), MAT 5191 (STAT 5501) and another course from the Department of Mathematics and Statistics at the graduate level. The degree awarded will in each case specify the discipline of the participating unit with Specialization in Biostatistics.

Most of the program requirements must be fulfilled in English. Students may write papers, submit theses and write examinations in both English and French.

Thesis

The thesis may contain new research in the area of mathematics and statistics or provide a review of the literature in one area. The thesis normally will be on statistics applied to health or biology; for example, the development of a new statistical procedure, the design of a new experiment or the analysis of data. The thesis should extend beyond the routine analysis of data. The supervisor and other members of the examination board may be drawn from faculty members in either epidemiology or mathematics and statistics or in other related departments.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers (in parentheses, three letters followed by four numbers) follow the current Carleton course number and credit information.

STAT 5902 [0.5 credit] (formerly 70.592)
(MAT 5992)
Seminar in Biostatistics
Students work in teams on the analysis of experimental data or experimental plans. The participation of experimenters in these teams is encouraged. Student teams present their results in the seminar, and prepare a brief written report on their work.

Mathematics and Statistics (see Mathematics and Statistics for course descriptions)

STAT 5600 (MAT 5190)

STAT 5501 (MAT 5191)

STAT 5902 (MAT 5992)

MATH 5909 (MAT 7999)

Epidemiology

EPI 5240 Epidemiology I

EPI 5241 Epidemiology II

EPI 6178 Clinical Trials

EPI 6278 Advanced Clinical Trials

EPI 5330 Vital and Health Statistics

EPI 6276 Quantitative Methods in Epidemiology

EPI 7999 M.Sc. Thesis

Business

Dunton Tower 710
Telephone: (613) 520-2388
Fax: (613) 520-4427

The Department

Director of the School, Vinod Kumar

Supervisor of Graduate Programs, Uma Kumar

The Eric Sprott School of Business offers a program of study and research leading to the degrees of Master of Business Administration and Ph.D. in Management.

Master of Business Administration

The focus of the M.B.A. program is applied research directed toward the management of technology, productivity, and innovation. The program of study will develop in students the conceptual and methodological skills required to manage, plan, develop, and implement technological capabilities for the purpose of attaining the strategic and operational goals of organizations.

The main areas of specialization within the program are:

- Business Information Systems
- Finance
- International Business
- Management
- Marketing
- Production and Operations
- Research and Development Administration

Graduate students in the School of Business are governed by the General Regulations section of this Calendar.

Admission Requirements

Admission into the program is judged primarily on the applicant's ability to successfully undertake advanced studies and research in business, his/her prospects for completion of the program, experience, and achievement.

Applicants are required to have the equivalent of an Honours bachelor's degree, with a minimum of high honours standing. Applicants are expected to have credits in mathematics and the following core courses, or their equivalents, in functional areas of business described below:

- BUSI 2101: Introduction to Organizational Behaviour

- BUSI 2208: Introduction to Marketing

- BUSI 2300: Introduction to Management Science

- BUSI 2400: Introduction to Information

Systems

- BUSI 2504: Essentials of Business Finance

- ECON 2200: Statistical Methods in the Social Sciences

In addition, applicants are expected to have an upper-level course sequence in their proposed area of business specialization, and to have an adequate grounding in at least one supporting fundamental discipline such as economics, psychology, sociology, mathematics, anthropology, or computer science.

The School requires that all applicants submit scores obtained in the Graduate Management Admission Test (GMAT) offered by the Educational Testing Services of Princeton, New Jersey. A superior GMAT score will be required for admission. All applicants whose native tongue is not English must take the TOEFL test and obtain a minimum score of 550 (see Section 3.6 in the General Regulations section of this Calendar).

The School's admission policy is governed by the availability of graduate student space. Possession of the minimum admission requirements does not, in itself, guarantee acceptance. Advanced standing may be granted for required courses only if previous work is judged to be equivalent to courses required in the program. Advanced standing and transfer of credit must be determined on an individual basis in consultation with the supervisor of graduate studies and must be approved at the time of admission by the Dean of the Faculty of Graduate Studies and Research. In general, a grade of B- or better is required in equivalent courses to obtain advanced standing.

Fast Track M.B.A.

Applicants who have:

- an honours business degree (equivalent to a B.Com. from Carleton University) or the expectation of completing the course requirements for such a degree by May of the year in which they plan to join the M.B.A. program;

- a minimum grade point average (GPA) of 10.0 in their business courses and 9.0 GPA or better overall in their business degree program;

- successful completion of courses in research methods (equivalent to BUSI 5902, Business Research Methods) and multivariate statistics (equivalent to BUSI 5903, Multivariate Statistics for Business Research) may apply for admission into the M.B.A. Program,

- without having to write an otherwise-required GMAT test, and

- may be admitted with an advanced standing of 1.0 credit.

Program Requirements

The requirement for the Master of Business Administration degree is the equivalent of 5.0 credits, of which at least 4.0 credits must be at the 5000-level or above. Candidates are required to select and follow one of the optional program patterns below, chosen in consultation with a graduate advisor:

Thesis Program
- 3.5 credits in courses of which 1.5 credits should be from required business courses (BUSI 5902, BUSI 5903, BUSI 5907), 1.0 credit from a selection of advanced seminars, and 1.0 credit of approved options as indicated below;

- a Thesis equivalent to 1.5 credits.

Research Project Program
- 4.5 credits of advanced seminars and approved options, including either BUSI 5902 or BUSI 5903 (as approved by the School). At least 1.5 of the 4.5 credits must be advanced seminars; at least 1.5 credits of the balance of 3 credits must be from graduate courses offered at the School;

- Research Project (0.5 credit).

Under exceptional circumstances, a student may, with the permission of the School, switch from the Thesis Program to the Research Project Program and vice versa upon completion of appropriate advanced seminars and approved options.

Advanced Seminars
- BUSI 5100, BUSI 5200, BUSI 5300, BUSI 5400, BUSI 5500, BUSI 5600, BUSI 5700, BUSI 5800

Approved Options
Courses which may be selected from those offered by the School or by other academic units, and approved by the School as suitable for the student's program.

Thesis

- BUSI 5909

The M.B.A. thesis is equivalent to 1.5 credits. The thesis normally relates to issues that are relevant to producers and users of technology.

The thesis must represent the result of the candidate's independent research undertaken after being admitted to graduate studies at Carleton University's School of Business. Previous work of the candidate may be used only as introductory or background material for the thesis.

A candidate may carry on research work related to the thesis off campus provided that the work is approved in advance and arrangements have

been made for regular supervision of thesis research activities with the School's supervisor of graduate studies.

All students require the School's approval for their proposed thesis topic.

Each candidate submitting a thesis will be required to take an oral examination on the subject of the thesis.

Research Project

- BUSI 5908

The M.B.A. research project is equivalent to 0.5 credit. The research project normally focuses on a business problem and should involve one or more of the following components: problem analysis and research design; library research and critical analysis; data collection and data analysis. The research project will be carried out under the direct supervision of one or more faculty members of the School. All students require the School's approval for their proposed research project topic. Each candidate submitting a research project will be required to submit a formal research report for evaluation.

Academic Standing

A grade of B- or better normally must be obtained in each credit counted towards the degree. A candidate may, with the recommendation of the School and the approval of the Dean of the Faculty of Graduate Studies and Research, be allowed a grade of C+ in 1.0 credit (or the equivalent).

Doctor of Philosophy

The focus of the Ph.D. program in Management is applied and basic research on complex management problems in a rapidly changing and globally oriented environment. The doctoral program in management is designed to develop graduates skilled in research with both a theoretical and practical understanding of the complex problems of business and managers. These graduates will pursue careers in university education and research, in training and research in private and public sector organizations, and in business management.

The program is designed to accomplish its objectives by its orientation to a holistic, integrative, and discipline-supported approach to management problem solving, focused on critical issues facing managers in organizations in both the private and public sectors.

The degree will normally be pursued on a full-time basis for the first two years.

Admission Requirements

Admission into the Ph.D. program will be judged primarily on the applicant's ability to undertake research successfully and his/her prospects for

completion of the program. Admission to the Ph.D. program is governed by the requirements stated in the General Regulations section of this Calendar.

The normal requirement for admission to the doctoral program in management is a master's degree (or equivalent) in business or a related field with an A- average. A number of years of work experience is desirable.

A student enrolled in the M.B.A. program (or a similar research-based master's program in business) who has completed a minimum of 2.5 credits and who has shown outstanding academic performance and research promise may be admitted to the Ph.D. program without completing the master's program. Normal Ph.D. program requirements, as stated below, will apply. Each case will be considered on an individual basis for advanced standing in the Ph.D. program. Advanced standing will be considered for a maximum of 1.5 credits.

Applicants who have completed a thesis-based master's program in business or a related area may have their program requirements, as set out below, adjusted at the time of admission.

All Ph.D. candidates, regardless of their previous field of specialization, are expected to have or to acquire a basic knowledge of statistics and at least two of the following areas of management: finance, marketing, organizational behaviour, management science, information systems, and productions/operations management. Students will be admitted to the program with a course of study designed where appropriate to supplement previous education, experience, and training.

The School requires that all applicants submit scores obtained in the Graduate Management Admission Test (GMAT) offered by the Education Testing Service of Princeton, New Jersey. A superior GMAT score will be required for consideration for admission. All applicants whose native tongue is not English must be tested for proficiency in the English language and obtain a minimum score of 550 on the TOEFL (see Section 3.6 in the General Regulations section of this Calendar).

Program Requirements

The program requirements for the Ph.D. in Management are:

- 10.0 credits comprised of the following: 1.5 credits in research and analysis methods; 1.5 credits of seminar courses in functional areas of business; 1.0 credit from a selection of advanced course electives in the School of Business; and 1.0 credit of free electives which must be approved by the thesis supervisor;

- A thesis normally equivalent to 5.0 of the 10.0 required credits, which must be defended at an oral examination;

- Two written and oral comprehensive examinations;

- Participation in the School of Business seminar series on current business issues for one year;

- Participation in a seminar series on, and classroom experience in, teaching methods;

- Presentation and oral defence of the thesis proposal.

Course Requirements

All students in the doctoral program are required complete successfully:

The following 0.5 credit courses:

- BUSI 6902, BUSI 6907 and either BUSI 6905 or BUSI 6906. Note: Students who have not successfully completed BUSI 5903 (or the equivalent) must do so before enrolling in BUSI 6905;

- 1.5 credits of advanced seminars including at least one two-course sequence, from the following doctoral seminar courses: BUSI 6100 and BUSI 6101; BUSI 6200 and BUSI 6201; BUSI 6300 and BUSI 6301; BUSI 6400 and BUSI 6401; BUSI 6500 and BUSI 6501;

- 1.0 credit from the following list of advanced seminars: BUSI 6701; BUSI 6702; BUSI 6703; BUSI 6704; BUSI 6801; BUSI 6802; BUSI 6803; BUSI 6804; BUSI 6805.

Students are strongly encouraged to complete 0.5 credit chosen from BUSI 6701, BUSI 6702, BUSI 6703, or BUSI 6704, a series of courses which focuses on the dimensions of complex problem representation and analysis. Students are also strongly encouraged to complete 0.5 credit chosen from BUSI 6801, BUSI 6802, BUSI 6803, BUSI 6804, or BUSI 6805, a series of courses oriented to specific management issues.

The remaining 1.0 credit elective, chosen with the approval of the thesis supervisor to assist in the thesis research process, normally wil be chosen from either those courses at the 5000- or 6000-level in the School of Business listed above, or from outside the School in a supporting discipline or in the area of statistics.

Thesis

All Ph.D. candidates are required to complete successfully a thesis normally equivalent to a minimum of 5.0 credits on a topic approved by the School. Students with appropriate background will be reviewed for possible adjustment of thesis weight.

Comprehensive Examinations

All Ph.D. candidates are required to complete successfully two written and two oral examinations. Normally, one of these

examinations will cover the functional area specialization of the student. The other examination will test the student's ability to integrate and apply knowledge to significant issues in management. The issues dealt with will be distinct from the thesis topic of the student.

The written comprehensive examination may take the form of two major essays, or one major essay and one research grant proposal developed for submission to an agency outside the School. The submission of each essay or grant proposal will be followed within one to three weeks by a comprehensive oral examination, which is not restricted to issues raised by the written portion.

The comprehensive examinations must be completed successfully before the Ph.D. proposal defence is scheduled. Normally, one oral defence must occur within four calendar terms of the student's initial registration in the Ph.D. program. The second must be defended within six calendar terms of initial registration. Students who do not fulfil this requirement may be asked to withdraw from the program.

Academic Standing

Doctoral students must normally obtain a grade of B- or better in each credit, and Satisfactory on the comprehensive examinations, the Ph.D. thesis and its oral defence.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

BUSI 5100 [0.5 credit] (formerly 42.510)
Theories in Organizational Behaviour
Theories and issues related to the management of individuals, teams, and small groups in organizations. Potential topics include personality and individual differences, attitudes, motivation, learning, job design, leadership, communication, decision-making, teams and small group behavior, careers, conflict and stress.

BUSI 5101 [0.5 credit] (formerly 42.511)
Theories of Organizational Design
A study of theories explaining and shaping the modern organization designs in the technologically advanced countries. Management structures and processes and with potential for meeting the challenges of global economy are analyzed.

BUSI 5200 [0.5 credit] (formerly 42.520)
Seminar in Marketing
Builds awareness of key marketing theory; assesses emerging thinking about the functioning, role, and tools of marketing. Topics emphasized include innovation theory, relationship marketing, new product introduction, marketing in a variety of sectors, such as, technology, services, and government, and the application of technology in marketing.

BUSI 5201 [0.5 credit] (formerly 42.521)
Contemporary Marketing Thought
Topics may include the development of paradigms in marketing, business to business marketing, recent advances in consumer behaviour, acquisition of information from the external environment, the influence of societal and environmental developments upon marketing, and new directions in marketing theory and practice.

BUSI 5300 [0.5 credit] (formerly 42.530)
Managing the Multinational Enterprise
This course examines issues in the management of Canadian and foreign multinational enterprises, including productivity in multi-site environments, international human resource management, international strategic planning, cross-national business negotiations, and managing cultural differences and their impact on the basic managerial functions.

BUSI 5301 [0.5 credit] (formerly 42.531)
Seminar in International Business Management
This course examines current international business topics. These change over time and may include management and marketing across different cultures, market selection and expansion modes, financing and marketing strategies, international diffusion of innovations, free trade blocs, and trends in global and Canadian trade and investment.

BUSI 5400 [0.5 credit] (formerly 42.540)
Seminar in Information Systems Management
This course is concerned with major issues in the management of information technology. It covers the following major topics: organization of information services, planning, management, and administration of information resources, assimilation and diffusion of information technology, integration of information services; and current opportunities and concerns in information services.

BUSI 5401 [0.5 credit] (formerly 42.541)
Current Topics in Business Information Systems
This course examines trends and issues associated with business information systems within organizations. It covers topics such as analysis and design of information systems, end-user computing, databases, and telecommunications. It may also include topics such as emerging technologies, knowledge-based systems and electronic commerce.

BUSI 5500 [0.5 credit] (formerly 42.550)
Seminar in Finance
An analysis of contemporary theory of finance. This analysis includes: the examination of innovations in corporate financing, financial planning, financing strategies, valuation of contingent claims, implications of agency theory, etc. Particular emphasis is placed on financial decision of technology-based firms.

BUSI 5501 [0.5 credit] (formerly 42.551)
Current Topics in Financial Research
This course examines research and empirical issues in investments, portfolio management, corporate finance, and capital markets. Particular emphasis will be placed on innovative research methods and financial innovations.

BUSI 5600 [0.5 credit] (formerly 42.560)
Seminar in Production and Operations Management
An introduction to the philosophies, methods, and techniques of modern production and operations management. It discusses design issues involving products, plants, equipment, layout, work organization, and their interrelations. It also discusses operational questions involving the planning and control of production, inventories, and product quality. Prerequisite: Graduate standing with Business BUSI 3300 or equivalent.

BUSI 5601 [0.5 credit] (formerly 42.561)
Strategic Management of Manufacturing Technology and Productivity
This course deals with manufacturing strategies related to changes in facilities, location, production technologies, sourcing arrangements and manufacturing infrastructure. Other topics include adoption and implementation of new technologies, and interactions with research and development.

BUSI 5700 [0.5 credit] (formerly 42.570)
Seminar in Management of Research and Development
Examines the mission of research and development, the management of research and development groups, the creation of technology and its deployment, specific managerial problems in the management of design and development activities, and the basic and applied research which supports these activities. Prerequisite: Graduate standing with Business BUSI 3300 or equivalent.

BUSI 5701 [0.5 credit] (formerly 42.571)
Current Topics in Research and Development and Innovation Diffusion
Concepts, theories, and methods of efficiently managing the technological innovation cycle, the innovation monitoring system incorporating the critical factors that signal the possible success or failure of a developing project, quality in research and development, technology transfer and models of the diffusion of an innovation.

BUSI 5800 [0.5 credit] (formerly 42.580)
Seminar in Decision Analysis
The analysis of decisions and the assessment of the quality of management systems based on the decisions they make. Topics include decision making and decision modeling, problem representation, and multi-attribute utility theory. All theoretical concepts will be illustrated using intuitive examples and practical applications.

BUSI 5900 [0.5 credit] (formerly 42.590)
Tutorials/Directed Studies in Business
Tutorials or directed readings in selected areas of business, involving presentation of papers as the basis for discussion with the tutor. A requirement for the course may be participation in an advanced business course at the undergraduate level.

BUSI 5902 [0.5 credit] (formerly 42.592)
Business Research Methods
A consideration of the basic issues of scientific research as applied to business problems. The course includes a discussion of the logic of scientific research, proof and verification, hypothesis testing, the logic of statistical inference, and research design.

BUSI 5903 [0.5 credit] (formerly 42.593)
Multivariate Statistics for Business Research
A study of the classical methods of multivariate statistics, including multiple regression, with an emphasis on: assumptions and coping with violations; developing a theoretical understanding of the methods; developing practical computer-based data analysis skills. Provides the background for studying more advanced statistical topics.

BUSI 5907 [0.5 credit] (formerly 42.597)
M.B.A. Thesis Tutorial
A seminar designed to help the student formulate and evaluate specific research topics. The successful submission of a thesis proposal is necessary for the completion of the course.

BUSI 5908 [0.5 credit] (formerly 42.598)
M.B.A. Research Project

BUSI 5909F (formerly 42.599)
M.B.A. Thesis Research
Prerequisite: BUSI 5907.

BUSI 6100 [0.5 credit] (formerly 42.610)
Seminar in Modern Organization Theory
The development of post-structuralist organization theory is examined. Theories of

organizational culture and symbolism, political theories of organization, ethnomethodological, decision-based and population ecology approaches are investigated. The social, economic, and intellectual forces shaping organization theory provides a major focus.

BUSI 6101 [0.5 credit] (formerly 42.611)
Current Topics in Organizational Behaviour
This course examines current topics and debates in the research on organizational behaviour. Potential topics include motivation, learning, communication, decision-making, small group behaviour, leadership, careers, power and conflict.

BUSI 6200 [0.5 credit] (formerly 42.620)
Seminar in Marketing I
Focuses on marketing theory, history, and current developments through the analysis, synthesis, and extension of theoretical and empirical papers on: the marketing concept, the role of marketing in various types of organizations, defining and segmenting markets; managing new product introductions, established products and marketing planning.

BUSI 6201 [0.5 credit] (formerly 42.621)
Seminar in Marketing II
This seminar focuses on marketing decision-making practice and theory in business and not-for-profit organizations in such areas as consumer decision-making, organizational decision-making, analytical methods, and research methods to aid in marketing decision-making.

BUSI 6300 [0.5 credit] (formerly 42.630)
Seminar in Management of Production/ Operations I: Strategic Management of Production Systems
The course focuses on developing the firm's strategies with respect to facilities, locations, production technologies, and sourcing arrangements. Also recent developments in management policies and practices that enable the production systems to operate at full potential in the wake of time- and quality-based competition.

BUSI 6301 [0.5 credit] (formerly 42.631)
Seminar in Management of Production/ Operations II: Production/Technology/ Strategy Interface
This course deals with the evolution and management of process innovation; management of productivity using production technologies; integration of production strategy and technology; and interactions with research and development. Topics include quality function deployment and the deployment of process innovations.

BUSI 6400 [0.5 credit] (formerly 42.640)
Seminar in Information Systems I: Information and Computing Technologies in Management
This course deals with research into the role of computing and communications technologies and information systems in the functioning of organizations and managers. Current developments in the information systems field will be analyzed and discussed.

BUSI 6401 [0.5 credit] (formerly 42.641)
Seminar in Information Systems II: Analysis and Design of Information Systems
This course examines theory and practice concerning factors determining the effective use of computing technologies, particularly on the match between the information systems and its users.

BUSI 6500 [0.5 credit] (formerly 42.650)
Seminar in Finance I
This course examines selected topics in financial theory. Specific topics are chosen according to new developments in theory and with the interests of the students in mind. These may include theory of derivatives, pricing theory, information asymmetries, agency theory, economic efficiency, and empirical methods.

BUSI 6501 [0.5 credit] (formerly 42.651)
Seminar in Finance II
A seminar designed to expose students to such emerging areas in finance as total quality management, left-hand financing, activity-based costing, multi-criteria decision-making, neural networks, etc. Integrative problems spanning two or more functional disciplines in management, such as taxation, are also explored.

BUSI 6701 [0.5 credit] (formerly 42.671)
Choice Behaviour
Examines choice behaviour from a variety of disciplines. Topics covered may include individual choice models in economics, Von-Neumann-Morgenstern utility, Luce Choice Axiom and its extensions, multi-criteria individual choice behaviour, and multi-criteria group choice behaviour.

BUSI 6702 [0.5 credit] (formerly 42.672)
Analysis and Representation of Complex Problems
This course uses qualitative and quantitative techniques and theoretical frameworks to represent organizational systems, problems and decisions that executives and managers face. The qualitative models are viewed as primary, providing the setting for the quantitative models, selection of choice mechanism, and interpretation of solutions.

BUSI 6703 [0.5 credit] (formerly 42.673)
Systems Concepts in Management
In this course a unified outlook toward management theory is developed through specifying system variables, components, boundaries and limitations. The importance of computer-based systems for analyzing and managing integrated systems will be examined in the context of control, decision-making and model-building.

BUSI 6704 [0.5 credit] (formerly 42.674)
Managing the Change Process

This course deals with both the process of organizational change and the external forces which drive such changes. Topics include both micro and macro theories of change and issues around change management such as leadership and resistance to change.

BUSI 6801 [0.5 credit] (formerly 42.681)
Management of Technology
Introduction to issues in the management of technology. Topics include: technology strategy and policy, technology forecasting and planning, the process of technology innovation from concept to market, research and development management, technology adoption, diffusion and implementation, technology transfer, and technology and social issues.

BUSI 6802 [0.5 credit] (formerly 42.682)
Women in Management
This course explores the research and organizational challenges arising from changing gender roles. Topics include: the sex segregation of work, gender differences in management styles, work-family conflict, women's careers, managing sexual harassment, employment equity and pay equity.

BUSI 6803 [0.5 credit] (formerly 42.683)
Corporate Strategy and Policy
This seminar focuses on the most important contributions concerning theories of the firm, origins of the modern corporation, analysis of the external environment, industry analysis, value chain analysis, resource-based theory, distinctions between corporate and business strategy, economies of scope, diversification and sustainable competitive advantage.

BUSI 6804 [0.5 credit] (formerly 42.684)
International Business Strategy
An advanced examination of contemporary theory on international business expansion. Topics include trade and investment flow interactions; expansion modes, location theory, and sequential expansion; globalization, consumer behaviour, and culture; trans-border information flows; internationalization by firm size; strategic alliances; and free trade blocs.

BUSI 6805 [0.5 credit] (formerly 42.685)
Canadian Business Competitiveness
Competitiveness at the country, industry, and firm levels, examined in the context of Canada's unique characteristics from various domestic and international perspectives including industrial organization theory, comparative perspectives on industrial concentration, internalization theory, Porter's competitiveness diamond, business-government interactions, and government support programs for business.

BUSI 6900 [0.5 credit] (formerly 42.690)
Directed Readings

Directed readings in selected areas of business, involving presentation of papers as the basis for discussion. A part of the requirement for the course may be participation in an advanced course at the undergraduate/graduate level.
Prerequisite: Permission of the School.

BUSI 6901 [0.5 credit] (formerly 42.691)
Special Topics
Designed to expose students to new and emerging issues in selected areas of business research. Integrative problems involving two or more areas of business research are also explored. The topics covered may vary from year to year.
Prerequisite: Permission of the School.

BUSI 6902 [0.5 credit] (formerly 42.692)
Research Methodology in Business
The study of research techniques commonly used in research on business and management issues. The development of knowledge of these methodologies and their application, as well as their possible use in the thesis research of the student are the two main goals of this course.

BUSI 6905 [0.5 credit] (formerly 42.695)
Advanced Statistical Methods for Business Research
A practical introduction to advanced statistical methods used in business research, with particular focus on discrete categorical data. Topics include the analysis of two-way and three-way tables; loglinear modeling; logistic regression; generalized linear models. Students will analyze real data using appropriate software packages.

BUSI 6906 [0.5 credit] (formerly 42.696)
Advanced Methods and Models of Management Science
Advanced study of decision-making under certainty and uncertainty. Topics include: constrained and unconstrained optimization; project management; scheduling and facilities location; multi-objective dynamic programming; multi-attribute utility theory; discrete choice. Links between theory and application will be illustrated through case studies and applied modeling.

BUSI 6907 [0.5 credit] (formerly 42.697)
Ph.D. Thesis Tutorial
An intensive preparation for Ph.D. thesis research, under the direction of one or more members of the School. The successful submission of a thesis proposal is necessary for the completion of the course.

BUSI 6908 (formerly 42.698)
Ph.D. Comprehensives
Preparation for comprehensive examinations.

BUSI 6909 (formerly 42.699)
Ph.D. Thesis

Canadian Studies

Dunton Tower 1206
Telephone: (613) 520-2366
Fax: (613) 520-3903
E-mail: canadian_studies@carleton.ca
Web site: www.carleton.ca/cdnstudies/

The School

Director, François Rocher (Acting)

Associate Director, To be announced

Graduate Supervisor, To be announced

Coordinator, Heritage Conservation, Julian Smith

Coordinator, Canadian Women's Studies, Katherine Arnup

Coordinator, Aboriginal Studies and the North, To be announced

Coordinator, Cultural Studies, Stan McMullin

Undergraduate Supervisor, To be announced

New Sun Chair in Aboriginal Art and Culture, Allan J. Ryan

Adjunct Professors, John B. Carroll, David C. Hawkes

Adjunct Research Professors, Pat Armstrong, Heather Menzies, James Page

Fellows, Richard T. Clippingdale, H. Blair Neatby

The School of Canadian Studies offers a program of study and research leading to the degrees of M.A. and Ph.D. in Canadian Studies.

The work of the School is conducted with the assistance of faculty and availability of course work in a variety of supporting departments including: Architecture, Art History, Economics, English, Film Studies, French, Geography, History, Journalism and Communication, Law, Linguistics and Applied Language Studies, Mass Communications, Music, Political Economy, Political Science, Psychology, Public Administration, Religion, Social Work, Sociology and Anthropology, and Women's Studies.

The Canadian Studies program is interdisciplinary in emphasis. It enables students in the School to develop individual areas of concentration to meet particular interests in a broad range of Canadian issues. The proximity of Carleton University to the National Library, the National Gallery of Canada, the national museums, the Library of Parliament, the National Archives of Canada, Statistics Canada, and the libraries of various government departments and embassies ensures excellent research facilities for graduate candidates in Canadian Studies.

In 1982, with the aid of a grant from the Donner Foundation, the School initiated a program area of northern and native studies, recently renamed Aboriginal Studies and the North. The same conditions and requirements apply as in other program areas; however, special consideration may be given to candidates for admission who have extensive knowledge of the north or of Aboriginal peoples, and the language requirement may be met by a demonstrated knowledge of an Aboriginal language in addition to English or French.

In 1983-84, a women's studies program area was instituted. Both interdisciplinary and comparative in focus, the program permits students to examine the interplay within the Canadian context between gender and race, gender and nationality, gender and class, and sex/gender. as a dynamic principle in the process of imperialism, nation building, and the construction of national and ethnic identities.

Since 1986, the School has offered a program area in Canadian culture and cultural policy. Students with a broad interest in traditional and popular culture, music, art, film, literature, and performing arts will find the program's interdisciplinary approach to cultural theory and practice of great value.

A program area in heritage conservation began in 1989-90. With an interdisciplinary focus on the Canadian natural and built environment, the program permits the course of study to be tailored to individual interest and backgrounds. The School of Architecture, the Department of Leisure Studies at Ottawa University, the Heritage Canada Foundation, and Parks Canada cooperate in offering the program. Beginning in 2000-2001 the School no longer offers these specific streams. Our courses however still allow students to pursue their interests in these content areas.

A joint Ph.D. degree program with Trent University was approved and introduced in 2000. This program builds on the combined strengths of the existing M.A. programs at the two universities, and provides Canada's only full interdisciplinary doctoral program in Canadian Studies. It has further enriched the graduate offerings by introducing five fields of study: Culture, Literature and the Arts; Environment and Heritage; Policy, Economy and Society, Identities; and Women's Studies.

Qualifying-Year Program

Applicants who do not qualify for direct admission to the master's program may, in exceptional cases, be admitted to a qualifying-year program. However, admission to the qualifying-year program does not imply automatic admission to the master's program. At the end of the qualifying-

year program the student will be required to apply for entry into the master's program, at which time the School will determine the student's eligibility to enter the program.

Master of Arts

Admission Requirements

Applicants normally must hold an Honours B.A. (or the equivalent), with at least high honours standing, in one of the disciplines represented in the School. Applicants wishing to be considered for financial assistance from Carleton University are advised to submit completed applications to the School by February 1, since enrolment in the School is limited.

Language Requirement

The School requires a reading knowledge of French. This requirement may be satisfied in the following ways:

- Successful completion of a 1000-level French course or its equivalent, preferably FREN 1006 (with a grade of B- or better).

- Successful completion of a French language examination.

- Alternatively, a student may fulfil this requirement with a demonstrated knowledge of an Aboriginal language.

- The School conducts the French language examinations in September and January. Students choosing the first option should note that examination results in these courses form part of their record, although they are additional to the course requirements for the degree.

Program Requirements

The minimum requirements for the master's program are outlined in the General Regulations section of this Calendar.

The School of Canadian Studies specifies that all candidates must select one of the following program patterns:

3.0 credits, a thesis, and an oral examination

4.0 credits, and a research essay

5.0 credits, and a comprehensive examination in two parts: part one based on CDNS 5001 and part two based on one of CDNS 5101, CDNS 5201, CDNS 5301, CDNS 5302 or CDNS 5401.

Whichever pattern is selected, all students in the master's program are required to take CDNS 5001 and two of the following courses: CDNS 5101, CDNS 5102, CDNS 5201, CDNS 5202, CDNS 5301, CDNS 5302, CDNS 5401, CDNS 5402, CDNS 5501, CDNS 5601.

Comprehensive Examinations

A committee will be assigned to each candidate choosing the 5.0 credit course option to advise and assist in the preparation for the comprehensive examination. Normally, the comprehensive examination is written ,but may, with the approval of the graduate supervisor,be oral. The comprehensive examination normally will be undertaken in the academic year in which the student completes CDNS 5001, but, with the approval of the graduate supervisor, may be undertaken at a later point in the student's program.

Thesis/Research Essay Proposal

Students are required to file with the School a detailed proposal of their thesis or research essay project no later than the end of the second term of registration for students enrolled full-time, and no later than the end of the fifth term of registration for students enrolled part-time. Students failing to file a proposal may not be permitted to register in subsequent terms until this requirement has been met. Approval of proposals shall be the responsibility of the student's intended thesis/research essay supervisor, the graduate supervisor of the School, and one other faculty member.

Special Course Offerings in Heritage Conservation Program Area

The School of Architecture offers two workshops in support of the Heritage Conservation Program Area. Students may take these courses as part of their M.A. requirements in Canadian Studies:

ARCC 5401

ARCU 5402

Proficiency in English

Proficiency in English is necessary to pursue graduate studies at Carleton University. All applicants whose first language is not English must satisfy this requirement by presenting a TOEFL score of 600 or better.

Ph.D. Program in Canadian Studies (joint program between Carleton University and Trent University)

Doctor of Philosophy

The doctoral program is offered jointly by the School of Canadian Studies at Carleton University and the Frost Centre for Canadian Studies and Native Studies at Trent University.

The Ph.D. program offers five fields of study: Culture, Literature, and the Arts; Environment and Heritage; Policy, Economy and Society; Identities; and Women's Studies. The program of courses and thesis guidance, drawing upon the faculty of the two academic units and universities, will encompass course requirements, comprehensive examinations, and a thesis.

The Ph.D. program in Canadian Studies normally will be undertaken on a full-time basis. In cases of exceptional merit, the School will accept a few candidates for the degree on a part-time basis.

Admission Requirements

The normal requirement for admission into the Ph.D. program is a master's degree (or equivalent), with at least high honours standing in Canadian Studies or one of the disciplines represented in the School. Applicants should note, however, that meeting the admission requirement does not guarantee admission to the program. Applicants wishing to be considered for financial assistance from Carleton University are advised to submit completed applications to the School by February 1, since enrolment in the School is limited.

Program Requirements

Doctoral candidates must complete successfully the equivalent of 10.0 credits. Candidates with deficiencies in certain areas may be admitted to the Ph.D. program, but normally will be required to complete additional work. The specific requirements are as follows:

- 1.0 credit for successful completion of CDNS 6900, the mandatory core seminar;

- 1.0 credit for successful completion of two 0.5-credit courses or tutorials (or the equivalent) at the graduate level from the list below, with one 0.5-credit course drawn from each of the candidate's two major fields of study; a GPA of 9.0 or better must be obtained in these courses for students to be allowed to proceed to the comprehensive examinations;

- 1.0 credit for successful completion of two 0.5-credit written comprehensive examinations. Students will be examined in two fields. Comprehensive examinations normally are written. Comprehensive examinations will be scheduled twice yearly: in September and in January. Normally, students will be expected to complete their comprehensives within 24 months of entering the program;

- Satisfactory demonstration of an understanding of a language other than English. Although French is the preferred

second language, students may be permitted to substitute an Aboriginal language indigenous to Canada or another language if it is demonstrably relevant to their research interests;

- A public defence, in English, of a written thesis proposal. Following the completion of their comprehensives, students will be expected to defend a proposal of the research and analysis they plan to undertake in completing their Ph.D. thesis. The thesis proposal defence should normally occur within six months of a student's comprehensive examinations. The thesis committee will be composed of three faculty members, always including one from each university;

- A 7.0-credit thesis, which must be successfully defended in English at an oral examination.

Canadian Studies Courses at Carleton University by Program Field

Culture, Literature, and the Arts

CDNS 5301, CDNS 5302

Environment and Heritage

CDNS 5401, CDNS 5402

Policy, Economy and Society

CDNS 5302, CDNS 5501, CDNS 5601

Identities

CDNS 5101, CDNS 5102, CDNS 5501

Women's Studies

CDNS 5201, CDNS 5202, CDNS 5501

To meet program requirements Carleton students must take at least one of the half-credit courses from the Canadian Studies courses listed above. Students can also choose from approved graduate courses at the Frost Centre for Canadian Studies and Native Studies at Trent University. Students should consult with the Graduate Studies Administrator for the complete listing of acceptable graduate courses available at Trent University in any given year.

Students may also register in graduate courses offered outside Canadian Studies. A list of courses with substantial Canadian content follows the Canadian Studies course list.

All graduate courses must be approved by the Ph.D. Coordinator at Carleton University.

Academic Standing

All Ph.D. candidates must obtain at least B+ standing or better (GPA 9.0) in each course

counted towards the degree. Comprehensive examinations (which will be graded on a Satisfactory, Unsatisfactory or Pass with Distinction basis) are exempted from this required standing.

Comprehensive Examinations

All Ph.D. candidates must complete successfully a written comprehensive examination in each of their two major fields. The examination is in the form of two examination papers normally written one week apart. Comprehensive examinations normally are written. At the discretion of the School, candidates may be required to take an oral examination following the written examination.

The fields of study for the Ph.D. comprehensive examinations are to be chosen from the following list:

Culture, Literature, and the Arts
A general knowledge of theories of culture in general, Canadian theoretical discourses on cultural practices, and on the interplay among theory, art, and literature, and their social contexts.

Environment and Heritage
A general knowledge of locality, landscape, environment and region in Canada.

Policy, Economy and Society
A general knowledge of the complex Web of relationships linking economy, civil society, and public policy in Canada and their interaction within social, political, and cultural life.

Identities
A general knowledge of the character and experience of individual, collective and communal identities in Canada.

Women's Studies
A general knowledge of women's experiences of the major dynamics of social, political, economic and cultural development at all levels of Canadian life.

Thesis Proposal

All students must defend publicly a thesis proposal after completing their comprehensive examinations. Full-time students must complete this requirement within the first two years of registration in the program.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/ sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Students not registered in the M.A. program in the School of Canadian Studies may take interdisciplinary seminars, with permission of the School.

CDNS 5001 [0.5 credit] (formerly 12.501)
Concepts of Canada
Interdisciplinary Seminar. Topic varies from year to year depending on instructor.
Prerequisite: Graduate standing in the School.

CDNS 5002 [0.5 credit] (formerly 12.502)
Interdisciplinary Methods
A survey of the issues raised by problem-directed methodologies; critiques of existing methodology including from the standpoints of feminist and Aboriginal scholarship.
Prerequisite: CDNS 5001.

CDNS 5003 [0.5 credit] (formerly 12.503)
Selected Topics in Canadian Studies
Topic varies from year to year.

CDNS 5101 [0.5 credit] (formerly 12.511)
Aboriginal and Northern Issues I
Interdisciplinary seminar. An examination of the systemic shift Aboriginal Peoples and their northern territories have entered, where material production and good governance have to co-exist with the production of cultural symbols and social relations.
Precludes additional credit for CDNS 5100.

CDNS 5102 [0.5 credit] (formerly 12.512)
Aboriginal and Northern Issues II
Interdisciplinary seminar. Developmental opportunities and constraints and the unique environments, experiences and living conditions which regulate Aboriginal Canada will be covered at micro and macro levels.
Precludes additional credit for CDNS 5100.
Prerequisite: CDNS 5101 or permission of the instructor.

CDNS 5201 [0.5 credit] (formerly 12.521)
Canadian Women's Studies
Interdisciplinary seminar. An examination of the historical roots and contemporary dimensions of feminist theories and women's movements in Canada.
Precludes additional credit for CDNS 5200.

CDNS 5202 [0.5 credit] (formerly 12.522)
Themes in Canadian Women's Studies
Interdisciplinary seminar. An interdisciplinary seminar focusing on one or more specific themes in Canadian women's studies. Topics may include women's paid and unpaid labour,

sexuality and sexual practices, women's health and reproductive rights, and motherhood.
Precludes additional credit for CDNS 5200.
Prerequisite: CDNS 5201 or permission of the instructor.

CDNS 5301 [0.5 credit] (formerly 12.531)
Canadian Cultural Studies
This interdisciplinary seminar studies the arts, belief systems, institutions and communicative practices in Canada in relation to other social and historical structures.
Precludes additional credit for CDNS 5300.

CDNS 5302 [0.5 credit] (formerly 12.532)
Canadian Cultural Policy
This interdisciplinary seminar examines the evolution of Canadian cultural policy from the Massey Commission through to the search for cultural cohesion within a global context.
Precludes additional credit for CDNS 5300.

CDNS 5401 [0.5 credit] (formerly 12.541)
Heritage Conservation: Theory
This interdisciplinary seminar examines the evolution and current status of conservation theory in Canada, as it affects both cultural and natural resources. Particular attention is given to architectural and cultural landscapes as historical evidence of human interaction with our environment.
Precludes additional credit for CDNS 5400.

CDNS 5402 [0.5 credit] (formerly 12.542)
Heritage Conservation: Practice
This interdisciplinary seminar considers various approaches to the conservation and *mise-en-valeur* of heritage resources, from scientific conservation to restoration to ritual reinterpretation and adaptive reuse. The seminar includes field exercises.
Precludes additional credit for CDNS 5400.
Prerequisite: CDNS 5401 or permission of the School.

CDNS 5501 [0.5 credit] (formerly 12.551)
Collective Identities in Canadian Societies
An interdisciplinary examination of the relationships and conflicts among sex/gender, race, language, ethnicity and nation. Particular emphasis will be given to gendered understandings of racism, nationalism, regionalism, and multi-culturalism; and to conflicts between individuals and collective rights claims.

CDNS 5601 [0.5 credit] (formerly 12.561)
Policy, Economy and Society in Canada
This interdisciplinary seminar will focus on relationships linking economy, civil society, and public policy in Canada and their interaction with social, political and cultural life. Themes to be examined include political economy, government moral regulation, community economic development and social change.

CDNS 5800 [1.0 credit] (formerly 12.580)
Internship/Practicum
Internships or practicum placements in an institutional setting outside of the University may fulfil up to one course credit. Students are required to complete a formal written paper in addition to their internship/practicum activities. The written work is evaluated jointly by the student's internal and external advisers.

CDNS 5801 [0.5 credit] (formerly 12.581)
Internship/Practicum
Internships or practicum placements in an institutional setting outside of the University may fulfil up to one course credit. Students are required to complete a formal written paper in addition to their internship/practicum activities. The written work is evaluated jointly by the student's internal and external advisers.

CDNS 5802 [0.5 credit] (formerly 12.582)
Internship/Practicum
Internships or practicum placements in an institutional setting outside of the University may fulfil up to one course credit. Students are required to complete a formal written paper in addition to their internship/practicum activities. The written work is evaluated jointly by the student's internal and external advisers.

CDNS 5803 [0.5 credit] (formerly 12.583)
Internship/Practicum
Internships or practicum placements in an institutional setting outside of the University may fulfil up to one course credit. Students are required to complete a formal written paper in addition to their internship/practicum activities. The written work is evaluated jointly by the student's internal and external advisers.

CDNS 5900 [1.0 credit] (formerly 12.590)
Directed Studies
Reading and research tutorials supervised by a qualified adviser, in an area not covered by an existing seminar. Directed Studies are organized by individual students with a faculty member. Only 1.0 credit of directed studies tutorial can be used towards completion of the degree.

CDNS 5901 [0.5 credit] (formerly 12.591)
Directed Studies
Reading and research tutorials supervised by a qualified adviser, in an area not covered by an existing seminar. Directed Studies are organized by individual students with a faculty member. Only 1.0 credit of directed studies tutorial can be used towards completion of the degree.

CDNS 5902 [1.0 credit] (formerly 12.592)
Directed Studies
Reading and research tutorials supervised by a qualified adviser, in an area not covered by an existing seminar. Directed Studies are organized by individual students with a faculty member. Only 1.0 credit of directed studies tutorial can be used towards completion of the degree.

CDNS 5903 [0.5 credit] (formerly 12.593)
Directed Studies
Reading and research tutorials supervised by a qualified adviser, in an area not covered by an existing seminar. Directed Studies are organized by individual students with a faculty member. Only 1.0 credit of directed studies tutorial can be used towards completion of the degree.

CDNS 5908 [1.0 credit] (formerly 12.598)
Research Essay

CDNS 5909 [2.0 credits] (formerly 12.599)
M.A. Thesis

CDNS 6900 [1.0 credit] (formerly 12.690)
Ph.D. Core Seminar: Interdisciplinarity in Canadian Studies: Concepts, Theories & Methods
An examination of the complex theoretical and methodological issues associated with the discourse on an interdisciplinary study of Canada. It will be offered at Carleton and Trent through a combination of joint sessions at both universities and regular electronic communication.

CDNS 6901 [0.5 credit] (formerly 12.691)
Ph.D. Tutorial
Reading and research tutorials. A program of research and written work in an area not covered by an existing graduate seminar.

CDNS 6902 [0.5 credit] (formerly 12.692)
Ph.D. Tutorial
Reading and research tutorials. A program of research and written work in an area not covered by an existing graduate seminar.

CDNS 6905 [0.5 credit] (formerly 12.695)
Ph.D. Comprehensive Examination
Available only to Ph.D. students in Canadian Studies. Students will receive a grade of Satisfactory, Unsatisfactory or Pass with Distinction.

CDNS 6907 [0.5 credit] (formerly 12.697)
Ph.D. Comprehensive Examination
Available only to Ph.D. students in Canadian Studies. Students will receive a grade of Satisfactory, Unsatisfactory or Pass with Distinction.

CDNS 6909 (formerly 12.699)
Ph.D. Thesis

Selection of Courses

In addition to the graduate courses offered by the School, the following courses are of particular relevance to students in Canadian Studies. The list is not exclusive and is subject to change. Other courses may qualify if the professor teaching the course includes substantial Canadian content. Permission of the Graduate Supervisor or Ph.D. Coordinator is required for these courses. Students in the master's program

in the School must complete at least 4.0 credits at the 5000- level, with the possibility of 1.0 credit at the 4000- level.

Note: Students should be aware that the number of spaces in graduate courses offered by other departments may be limited, and that registration may be conditional upon obtaining the prior approval of the department concerned. It is the responsibility of the student to ensure that permission is obtained from the appropriate department prior to registering in any of the department's courses.

Anthropology
ANTH 4700 Selected Problems in the Study of North American Native Peoples

ANTH 5106, ANTH 5107, ANTH 5308

Architecture
ARCH 4203 Society and Shelter

ARCH 5000, ARCH 5001, ARCH 5002, ARCC 5401, ARCU 5402

Art History
ARTH 4000 Topics in Canadian Art: Art of the Land

ARTH 4005 Historic Dress Traditions of Canadian Indian Peoples

ARTH 4601 Topics in Twentieth-Century Art: Women Artists and Modernism in Europe and America

ARTH 4800 Readings in Twentieth-Century Architectural History

ARTH 4900 Directed Readings and Research

ARTH 4901 Directed Readings and Research

ARTH 4902 Directed Readings and Research

ARTH 5000, ARTH 5001, ARTH 5002, ARTH 5101

Comparative Literary Studies
CLST 5302, CLST 5508

Economics
ECON 4306 Employment Economics and Labour Policy

ECON 4800 Urban Economics

ECON 5301, ECON 5302, ECON 5303, ECON 5305, ECON 5401, ECON 5402, ECON 5801, ECON 5802

English Language and Literature
ENGL 4802 Studies in Canadian Ethnic Minority Language

ENGL 4803 Studies in the Literature of Quebec and English Canada

ENGL 4806 Studies in Canadian Literature I

ENGL 4807 Studies in Canadian Literature II

ENGL 4808 Canadian Writing and the Literatures of the First Nations

ENGL 5801, ENGL 5802, ENGL 5803, ENGL 5805, ENGL 5807, ENGL 5809

Film Studies -
FILM 5208, FILM 5209

French
FREN 5500, FREN 5700

Geography
GEOG 4203 Urban Revitalization

GEOG 4207 Urban Development and Analysis

GEOG 4301 Advanced Cultural Geography

GEOG 4305 Historical Geography

GEOG 4407 Canadian Agriculture

GEOG 5401, GEOG 5403, GEOG 5405, GEOG 5700, GEOG 5702, GEOG 5703

History
HIST 4202 The Maritimes in Transition, 1870s to 1920s

HIST 4204 Canadian Immigration and Ethnic History

HIST 4206 Perspectives on State Formation in Canada

HIST 4300 Colonial Society in British North America

HIST 4301 Canada from Confederation to the Great War

HIST 4303 Selected Problems in Canadian Business History, 1850-1980

HIST 4304 History of Northern Canada

HIST 4307 Seminar on Canada from War to War

HIST 4308 Studies in the History of Popular Culture

HIST 4309 Seminar on Modern Canada Since 1939

HIST 4504 Selected Problems in the History of Women and the Family: The Pre-Industrial Atlantic World

HIST 4509 Selected Problems in the History of Women and Gender in the Nineteenth and Twentieth Centuries

HIST 5000, HIST 5205, HIST 5206, HIST 5209, HIST 5300, HIST 5301, HIST 5302, HIST 5303, HIST 5304, HIST 5305, HIST 5306, HIST 5307, HIST 5506, HIST 5509, HIST 5808

Journalism and Communication
JOUR 5000, JOUR 5305, JOUR 5401, JOUR 5500

Law
LAWS 4001 Law, Family and Gender

LAWS 4002 Feminist Theories of Law

LAWS 4107 Law in Advanced Capitalist Society

LAWS 4309 Criminal Proceedings and Dissent: Political Offences and National Security Measures

LAWS 4405 Labour Relations in the Public Service

LAWS 4501 Selected Problems in Comparative Constitutional Law

LAWS 4504 Aboriginal Peoples and the Canadian Criminal Legal System

LAWS 4507 Administrative Law and Control

LAWS 4807 Quebec Civil Law

LAWS 5002, LAWS 5007, LAWS 5008, LAWS 5302, LAWS 5405, LAWS 5500, LAWS 5503, LAWS 5900, LAWS 5901, LAWS 5903, LAWS 5904

Mass Communication
MCOM 4100 Selected Topics in Mass Communication Analysis

MCOM 4102 Selected Topics in Mass Communication Analysis

MCOM 4500 Mass Media and Capitalist Democracy I

MCOM 4501 Mass Media and Capitalist Democracy II

MCOM 5201, MCOM 5203, MCOM 5205, MCOM 5301, MCOM 5505, MCOM 5506, MCOM 5507, MCOM 5508, MCOM 5509, MCOM 5605

Music
MUSI 5001, MUSI 5005, MUSI 5100, MUSI 5101, MUSI 5102, MUSI 5105

Political Science
PSCI 4000 Topics in Canadian Government and Politics

PSCI 4002 Policy Seminar: Problems of Northern Development

PSCI 4003 Politics and the Media

PSCI 4005 Unity, Disunity and Federalism

PSCI 4006 Legislative Process in Canada

PSCI 4007 The Politics of Law Enforcement in Canada

PSCI 4008 National Security and Intelligence in the Modern State

PSCI 4009 Quebec Politics

PSCI 4100 Canadian and Comparative Local Government and Politics

PSCI 4101 French-English Relations

PSCI 4106 Labour and the Canadian State

PSCI 4107 Political Participation in Canada

PSCI 4108 Canadian Provincial Government and Politics

PSCI 4109 The Politics of the Canadian Charter of Rights and Freedoms

PSCI 4204 Elections

PSCI 4206 Indigenous Politics of North America

PSCI 4401 Business-Government Relations in Canada

PSCI 5003, PSCI 5000, PSCI 5006, PSCI 5007, PSCI 5008, PSCI 5009, PSCI 5100, PSCI 5101, PSCI 5200, PSCI 5201, PSCI 5306, PSCI 5307, PSCI 5401, PSCI 5507, PSCI 5601, PSCI 6000, PSCI 6001

Public Administration
PADM 5000, PADM 5004, PADM 5006, PADM 5008, PADM 5009, PADM 5106, PADM 5109, PADM 5205, PADM 5306, PADM 5308, PADM 5600, PADM 5604, PADM 5607, PADM 5701, PADM 5704, PADM 5804, PADM 5806, PADM 5809

Social Work
SOWK 4102 Aboriginal Peoples and Social Policy

SOWK 4103 Practice and Policy in Immigration

SOWK 4203 Social Work Practice from an Aboriginal Perspective

SOWK 4204 Social Work and Aging

SOWK 5100, SOWK 5101, SOWK 5102, SOWK 5105, SOWK 5106, SOWK 5108, SOWK 5207, SOWK 5301, SOWK 5302, SOWK 5704

Sociology
SOCI 4501 Workshop in Demography/Human Ecology

SOCI 4502 Workshop on Work and Organizations

SOCI 5205, SOCI 5302, SOCI 5308, SOCI 5400, SOCI 5405, SOCI 5608

Women's Studies
WOMN 4901 Selected Topics in Women's Studies I

WOMN 4902 Selected Topics in Women's Studies II

WOMN 5000, WOMN 5001

Ph.D. Program in Canadian Studies
(Joint program between Carleton University
and Trent University)

Trent University

Carleton University

Doctor of Philosophy

The doctoral program is offered jointly by the School of Canadian Studies at Carleton University and the Frost Centre for Canadian Heritage and Development Studies at Trent University.

The Ph.D. program offers five fields of study: Culture, Literature, and the Arts; Environment and Heritage; Policy, Economy and Society; Identities; and Women's Studies. The program of courses and thesis guidance, drawing upon the faculty of the two academic units and universities, will encompass course requirements, comprehensive examinations, and a thesis.

The Ph.D. program in Canadian Studies normally will be undertaken on a full-time basis. In cases of exceptional merit, the School will accept a few candidates for the degree on a part-time basis.

Admission Requirements

The normal requirement for admission into the Ph.D. program is a master's degree (or equivalent), with at least high honours standing, in Canadian Studies or one of the disciplines represented in the School. Applicants should note, however, that meeting the admission requirement does not guarantee admission to the program.

Program Requirements

Doctoral candidates must successfully complete the equivalent of 10.0 credits. Candidates who have deficiencies in certain areas may be admitted to the Ph.D. program, but normally will be required to complete additional work. The specific requirements are as follows:

- 1.0 credit for successful completion of CDNS 6900, the mandatory core seminar;

- 1.0 credit for successful completion of two half-credit courses or tutorials (or the equivalent) at the graduate level from the list below, with one 0.5-credit course drawn from each of the candidate's two major fields of study. A GPA of 9.0 or better must be obtained in these courses for students to be allowed to proceed to the comprehensive examinations;

- 1.0 credit for successful completion of two half-credit written comprehensive examinations. Students will be examined in two fields. Comprehensive examinations are

normally written. Comprehensive examinations will be scheduled twice yearly; in September and in January. Normally, students will be expected to complete their comprehensives within 24 months of entering the program;

- Satisfactory demonstration of an understanding of a language other than English. Although French is the preferred second language, students may be permitted to substitute an Aboriginal language indigenous to Canada or another language if it is demonstrably relevant to their research interests;

- A public defence, in English, of a written thesis proposal. Following the completion of their comprehensives, students will be expected to defend a proposal of the research and analysis they plan to undertake in completing their Ph.D. dissertation. Normally, the dissertation proposal defence should occur within six months of a student's comprehensive examinations. The dissertation committee will be composed of three faculty members, always including one from each university;

- A 7.0 credit thesis, which must be successfully defended in English at an oral examination.

Canadian Studies Courses at Carleton University by Program Field

Culture, Literature and the Arts
CDNS 5301, CDNS 5302

Environment and Heritage
CDNS 5401, CDNS 5402

Policy, Economy and Society
CDNS 5302, CDNS 5501, CDNS 5601

Identities
CDNS 5101, CDNS 5102, CDNS 5501

Women's Studies
CDNS 5201, CDNS 5202, CDNS 5501

To meet program requirements Carleton students must take at least one of the half-credit courses from the Canadian Studies courses listed above. Students can also choose from approved graduate courses at the Frost Centre for Canadian Heritage and Development Studies at Trent University. Students should consult with the Graduate Studies Administrator for the complete listing of acceptable graduate courses available at Trent University in any given year.

Students may also register in graduate courses offered outside Canadian Studies. A list of courses with substantial Canadian content follows the Canadian Studies course list.

All graduate courses must be approved by the Ph.D. Coordinator at Carleton University.

Academic Standing

All Ph.D. candidates must obtain at least B+ standing or better (GPA 9.0) in each credit counted towards the degree. Comprehensive examinations (which will be graded on a Satisfactory, Unsatisfactory or Pass with Distinction basis) are exempted from this required standing.

Comprehensive Examinations

All Ph.D. candidates must successfully complete a written comprehensive examination in each of their two major fields. The examination is in the form of two examination papers normally written one week apart. Normally, comprehensive examinations are written. At the discretion of the School, candidates may be required to take an oral examination following the written examination.

The fields of study for the Ph.D. comprehensive examinations are to be chosen from the following list:

Culture, Literature, and the Arts
A general knowledge of theories of culture in general, Canadian theoretical discourses on cultural practices, and on the interplay among theory, art, and literature, and their social contexts.

Environment and Heritage
A general knowledge of locality, landscape, environment and region in Canada.

Policy, Economy and Society
A general knowledge of the complex Web of relationships linking economy, civil society, and public policy in Canada and their interaction within social, political, and cultural life.

Identities
A general knowledge of the character and experience of individual, collective and communal identities in Canada.

Women's Studies
A general knowledge of women's experiences of the major dynamics of social, political, economic and cultural development at all levels of Canadian life.

Thesis Proposal

All students must publicly defend a thesis proposal after completing their comprehensive examinations. Full-time students must complete this requirement within the first two years of registration in the program.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

CDNS 6900 [1.0 credit] (formerly 12.690)
Ph.D. Core Seminar: Interdisciplinarity in Canadian Studies: Concepts, Theories & Methods
An examination of the complex theoretical and methodological issues associated with the discourse on an interdisciplinary study of Canada. It will be offered at Carleton and Trent through a combination of joint sessions at both universities and regular electronic communication.

CDNS 6901 [0.5 credit] (formerly 12.691)
Ph.D. Tutorial
Reading and research tutorials. A program of research and written work in an area not covered by an existing graduate seminar.

CDNS 6902 [0.5 credit] (formerly 12.692)
Ph.D. Tutorial
Reading and research tutorials. A program of research and written work in an area not covered by an existing graduate seminar.

CDNS 6905 [0.5 credit] (formerly 12.695)
Ph.D. Comprehensive Examination
Available only to Ph.D. Students. Students will receive a grade of Satisfactory, Unsatisfactory or Pass with Distinction.

CDNS 6907 [0.5 credit] (formerly 12.697)
Ph.D. Comprehensive Examination
Available only to Ph.D. Students. Students will receive a grade of Satisfactory, Unsatisfactory or Pass with Distinction.

CDNS 6909 (formerly 12.699)
Ph.D. Thesis

The Ottawa-Carleton Chemistry Institute

2240 Herzberg Building
Telephone: (613) 520-3515
Fax: (613) 520-5613

The Institute

Director of the Institute, R.J. Crutchley

Associate Director of the Institute,
Sandro Gambarotta

The Ottawa-Carleton Chemistry Institute, established in 1981, is a joint program of graduate studies and research in chemistry for Carleton University and the University of Ottawa. The Institute combines the research strengths and resources of the Departments of Chemistry at both campuses. Research facilities are shared and include: a major mass spectrometry centre, X-ray spectrometer, several modern NMR spectrometers, a pico-second laser facility, an ultratrace analysis laboratory, and an electrochemical research centre. In addition, the resources of many federal departments are available to graduate students, including the National Research Council and its library, the National Science Library (CISTI), and departments of Health and Welfare and Agriculture.

The Institute offers the M.Sc. and Ph.D. degrees in all areas of chemistry, including biochemistry, analytical, inorganic, organic, physical and theoretical chemistry. All thesis, seminar and examination requirements may be met in either English or French. Students will be enrolled at the campus where the research supervisor is located. Several graduate students also conduct their research off campus under the supervision of one of the Institute's adjunct professors.

Application forms and further information may be obtained by writing to the director of the Institute.

Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology

The Departments of Chemistry and Biology at Carleton University and the University of Ottawa provide a collaborative program in chemical and environmental toxicology at the M.Sc. level. For further details, see the Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology's section of this Calendar.

Members of the Institute

- Howard Alper, *Organometallic Chemistry*
- Louis Barriault, *Synthetic Organic Chemistry*
- A.D.O. Bawagan, *Chemical Physics*
- D.M. Bishop, *Theoretical Chemistry*
- G.W. Buchanan, *Applications of NMR Spectroscopy*
- P.H. Buist, *Bio-organic Chemistry*
- R.C. Burk, *Environmental and Analytical Chemistry*
- A.J. Carty, *Organometallic and Inorganic Chemistry (Adjunct)*
- C.L. Chakrabarti, *Environmental Chemistry, Analytical Chemistry*
- B.E. Conway, *Electrochemistry and Surface Chemistry*
- R.J. Crutchley, *Physical Inorganic Chemistry*
- Christian Detellier, *Bio-inorganic Chemistry*
- Tony Durst, *Synthetic and Medicinal Organic Chemistry*
- A.G. Fallis, *Synthetic Organic Chemistry*
- D.E. Fogg, *Organometallic, Polymer and Materials Chemistry*
- Sandro Gambarotta, *Inorganic Chemistry*
- B.R. Hollebone, *Chemical Spectroscopy and Chemical Toxicology*
- J.L. Holmes, *Mass Spectroscopy*
- K.U. Ingold, *Physical Organic Chemistry, Free Radicals (Adjunct)*
- Harvey Kaplan, *Biochemistry*
- Peeter Kruus, *Solution Physical Chemistry, Ultrasonics*
- E.P.C. Lai, *Analytical Chemistry*
- Paul M. Mayer, *Gas Phase Ion Chemistry*
- D. Miller, *Environmental Chemistry*
- B.A. Morrow, *Surface Chemistry and Catalysis*
- R.J. Norstrom, *Environmental Chemistry (Adjunct)*
- Arya Prabhat, *Organic (Adjunct)*
- D.S. Richeson, *Inorganic, Solid State and Organometallic Chemistry*
- J.A. Ripmeester, *Supramolecular Materials, NMR Spectroscopy (Adjunct)*
- R. Roy, *Glycobiology, Combinational and Medicinal Chemistry*
- J.C. Scaiano, *Photochemistry*
- Alain St.-Amant, *Theoretical and Computational Chemistry*
- S. Scott, *Surface Chemistry & Catalysis*

- K.B. Storey, *Enzyme Biochemistry, Biotechnology*
- P. (Sundar) Sundararajan, *Morphology of Polymers and Smart Materials*
- Heshel Teitelbaum, *Chemical Kinetics*
- C.S. Tsai, *Enzyme Action and Yeast Cultures*
- Z.Y. Wang, *Synthetic Polymer Chemistry and Organic Chemistry*
- William G. Willmore, *Biochemistry, Biotechnology*
- J.S. Wright, *Theoretical Chemistry*

Master of Science

Admission Requirements

The normal requirement for admission to the program is an Honours B.Sc. degree in Chemistry, with a B+ average in the last two years and a B average overall. Applicants who do not meet this requirement, or whose undergraduate degree is in another, closely related field, may be accepted into the program, but may be assigned extra courses.

Program Requirements

1. A research thesis defended at an oral examination (3.0 credits)

2. One credit of graduate courses (made up of any combination of 0.5 credit and 0.25 credit courses)

3. CHEM 5801 (1.0 credit)

Guidelines for Completion of Master's Degree

Full-time students in the master's program will normally complete the degree requirements in two-years. Part-time students will normally complete the degree requirements in four years.

Doctor of Philosophy

Admission Requirements

The normal requirement for admission to the Ph.D. program is a B.Sc. or M.Sc. degree in Chemistry.

Program Requirements (from B.Sc.)

1. A research thesis defended before an examination board which includes an external examiner (11.0 credits)

2. A comprehensive examination in chemistry. The format of this examination depends on the field of chemistry in which the student is conducting his/her research. At Carleton this normally takes the form of a research proposal examination.

Students who fail to complete the comprehensive examination by the end of their third year in the graduate school will be deregistered from the program. (No credit, Pass or Fail)

3. Two credits of graduate courses (made up of any combination of 0.5 credit and 0.25 credit courses)

4. CHEM 5801 (1.0 credit) and CHEM 5802 (1.0 credit)

Program Requirements (from M.Sc.)

Same as above, except that under exceptional circumstances only one seminar course will be required and credit for up to one credit of graduate courses may be given to reduce the requirement for graduate course credit from two to one. Students must complete their comprehensive examination within two years or be deregistered from the program.

Residence Requirements

For the M.Sc. degree:
- At least one year of full-time study

For the Ph.D. degree (from B.Sc.)
- At least three years of full-time study

For the Ph.D. degree (from M.Sc.)
- At least two years of full-time study

Guidelines for Completion of Doctoral Degree

Full-time students in the doctoral program normally will complete the degree requirements in three years. Part-time students will normally complete the degree requirements in six years.

Full-time students who enter the doctoral program directly from the B.Sc. program normally will complete the degree requirements in four and one-half years. Part-time students normally will complete the degree requirements in nine years.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003. Students may also wish to consult the Institute's Web site at: www.carleton.ca/occi.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable. University of Ottawa course numbers

(in parentheses) follow the Carleton course number and credit information. To determine the term of offering, consult the Registration Instructions and Class Schedule booklet, or online at: www.carleton.ca/cu/programs/sched_dates/.

CHEM 5000 [0.25 credit] (CHM 8355)
Trace Elemental Analysis using Inductively Coupled Plasma Emission (ICP-ES) and Mass Spectrometry (ICP-MS)
ICP-ES/MS techniques are among the most powerful tools presently available for elemental analysis for a wide range of interests such as environmental, geological and biological applications. The fundamentals, state of the art instrumentation, applications, existing challenges, and new research and developments will be covered.

CHEM 5001 [0.25 credit] (CHM 8301)
Analytical Mass Spectrometry
The principles of ion sources and mass spectrometers will be described, together with their applications to problems in chemistry and biochemistry. Introduction to the chemistry of gaseous ions. Ion optics. Special emphasis on interpreting mass spectra.

CHEM 5002 [0.25 credit] (CHM 8301)
Multinuclear Magnetic Resonance Spectroscopy
Principles of Nuclear Magnetic Resonance (NMR). The NMR parameters to be studied are: chemical shift, spin-spin coupling, electric quadrupole coupling, spin-spin and spin-lattice relaxation rates. NMR and the periodic table. Dynamic NMR. Applications in chemistry and biochemistry. The Fourier Transform technique. Pulse sequences. Basic principles and applications of two-dimensional NMR.

CHEM 5003 [0.25 credit] (CHM 8325)
Solid State NMR Spectroscopy
This course provides the student with a brief introduction to solid state NMR spectroscopy. Topics will include dipolar coupling interactions, chemical shielding anisotropy, the quadrupolar interaction and averaging techniques such as magic angle spinning.

CHEM 5004 [0.25 credit] (CHM 8326)
NMR Spectroscopy
Advanced NMR techniques for both proton and carbon spectra, various decoupling and related experiments. Interpretation of NOSY, COSY and related data.

CHEM 5005 [0.25 credit] (CHM 8327)
Physical Organic Chemistry
Hammett functions, transition state energies, stereochemistry of organic compounds, and mechanisms of organic reactions and their determination.

CHEM 5006 [0.25 credit] (CHM 8335)
Ionic Processes in the Atmosphere and Interstellar Space
Discusses the importance of ionic reactions in the upper atmosphere and in the interstellar medium. The dynamics of ion-molecule reactions and experimental and theoretical approaches for their study.

CHEM 5007 [0.25 credit] (CHM 8310)
Introduction to Photochemistry
Basic principles of photochemistry including selection rules, energy transfer processes and the properties of excited state reactions. Lasers and their applications to measurements of the dynamics of elementary reactions.

CHEM 5008 [0.25 credit] (CHM 8311)
Advanced and Applied Photochemistry
Photochemical reactions of small molecules and their relationship to atmospheric chemistry. Production and detection of reactive species. Photolysis. Multiphoton absorption.
Prerequisite: CHM 8150

CHEM 5009 [0.5 credit] (CHM 8150)
Special Topics in Molecular Spectroscopy
Topics of current interest in molecular spectroscopy: electronic spectra of diatomic and triatomic molecules and their interpretation using molecular orbital diagrams; Raman and resonance Raman spectroscopy; symmetry aspects of vibrational and electronic levels of ions and molecules in solids; weak and strong resonant laser radiation. (Also listed as PHYS 5202/PHY 8122.)

CHEM 5100 [0.25 credit] (CHM 8338)
Unimolecular Reaction Dynamics: Experiment and Theory
Presents the theoretical models that have been developed for the understanding of unimolecular reactions, focusing on statistical theories such as RRKM theory. Experimental techniques for exploring the kinetics and mechanism of unimolecular reactions will be covered, including mass spectrometry, coincidence spectroscopy and ZEKE spectroscopy.

CHEM 5101 [0.5 credit] (CHM 8202)
Chemical Physics of Electron-Molecule Collisions
Basic classical scattering theory and quantum mechanical scattering theory. Experimental aspects, such as electron optics, electron gun fundamentals, energy analyzers and electron detectors. Applications to the understanding of the chemistry of materials.

CHEM 5102 [0.25 credit] (CHM 8346)
Supercritical Fluids
Fundamental and practical aspects of the uses of supercritical fluids in the chemistry laboratory. Thermodynamic treatment of high pressure multicomponent phase equilibria, transport properties, solubilities, supercritical fluid extraction and chromatography for analytical purposes, reactions in supercritical fluids, equipment considerations, new developments.

CHEM 5103 [0.25 credit] (CHM 8318)
Free Radicals
Photochemical generation of free radical reaction intermediates in the condensed phase. Techniques to be explored include laser flash photolysis, pulse radiolysis, esr, CIDNP and matrix isolation.

CHEM 5104 [0.25 credit] (CHM 8317)
Ionic Reaction Intermediates
Generation of ionic reaction intermediates in the condensed phase and their characterization by experimental techniques. Includes carbocations, zwitterionic intermediates.

CHEM 5105 [0.25 credit] (CHM 8339)
Heterogeneous Catalysis
Principles of catalytic reactions and topics in modern applications of catalysis. Bonding of substrates on surfaces; cluster-surface analogy; ensemble requirements; mechanisms of catalysis on metal and metal oxide surfaces.

CHEM 5106 [0.25 credit] (CHM 8340)
Organotransition Metal Catalysis: E-H Bond Activation
The course will focus on the catalytic activation of E-H bonds by soluble organometallic complexes. Examples may include: hydrogenation, hydrosilation and hydroboration catalysis, hydroamination and hydro-phosphination.

CHEM 5107 [0.25 credit] (CHM 8341)
Transition-Metal Catalyzed Polymerization
Recent developments in polymerization catalysis via transition metal complexes will be discussed, including insertion, metathesis, and atom-transfer polymerization. The course will include a brief overview of relevant concepts in polymer chemistry (e.g. molecular weight, polydispersity, living polymerization, the glass transition).

CHEM 5200 [0.25 credit] (CHM 8342)
Clay Minerals Chemistry
Occurrence, classification and mineralogy of clay minerals. Intercalation processes and chemical modifications. Characterization of natural and modified clays. Industrial applications.

CHEM 5201 [0.25 credit] (CHM 8321)
Solid State Chemistry
Thermodynamic and kinetic aspects of solid state synthesis. Characterization of solids. Chemical and physical properties of solids that may include aspects of intercalation reactions, ionic conductors, glasses, electronic, magnetic optical and physical/mechanical properties.

CHEM 5202 [0.25 credit] (CHM 8343)
Chemistry of the Main Group Elements.
Fundamental and applied aspects of main group element chemistry. Topics may include non-metal chemistry, main group organometallic chemistry, application of main group element compounds to solid state synthesis (e.g. CVD and/or sol gel processes), uses of main group element compounds in synthesis.

CHEM 5203 [0.25 credit] (CHM 8322)
Topics in Co-ordination Chemistry
The course will consist of a brief introduction to basic concepts in co-ordination chemistry, including carbon dioxide fixation, dinitrogen fixation, activation, olefin metathesis, nature of the M-M bond.

CHEM 5204 [0.25 credit] (CHM 8303)
Descriptive Organometallic Chemistry
The course reviews basic concepts of M-C bonds, the preparation and reactivity of transition and non-transition metal organometallic species. Brief discussion of the most important catalytic processes (e.g. Ziegler-Natta, Fisher-Tropsch, catalytic hydrogenation and hydroformilation) will be also offered.

CHEM 5205 [0.25 credit] (CHM 8307)
Ions and Ionic Processes in Chemistry
Properties of water, hydration of ions, ionic interaction, colloidal and polymeric electrolytes. Ionization processes in solution.

CHEM 5300 [0.25 credit] (CHM 8331)
Physical Chemistry of Biological Macromolecules
Application of physical techniques normally applied to small molecules, used to study macromolecular structure and function of DNA and proteins. Examples include: kinetics, electrochemistry, equilibria phenomena (thermodynamics).

CHEM 5301 [0.25 credit] (CHM 8332)
Electrochemical Phenomena in Biological Systems
Description of theory accounting for the generation of membrane potentials. Application to the generation of nerve impulses.

CHEM 5302 [0.25 credit] (CHM 8333)
Surface Phenomena in Biological Systems
Description of theory of surface tension phenomena in aqueous systems. Discussion of effects of cell and macromolecular structures in biological systems.

CHEM 5303 [0.5 credit] (CHM 8126)
Bioorganic Chemistry
Overview of recent developments in the mechanistic understanding of selected enzyme-catalyzed reactions. Topics include Cytochrome P450, methane monooxygenase, biotin and lipoic acid biosynthesis, methyl transfer, Vitamin B12, lipoxygenase, prostaglandin synthase, etc. Emphasis will be placed on biotransformations which are relatively poorly understood from a mechanistic point of view.

CHEM 5304 [0.25 credit] (CHM 8349)
Free Radicals in Chemistry and Biology
Oxidative stress induced by free radicals plays a significant role in fatal and chronic diseases. The chemistry of bio-radicals will be described and related to pathobiological processes such as lipid peroxidation and atherosclerosis, protein nitration and cross linking, and DNA scission.

CHEM 5309 [0.25 credit] (CHM 8347)
Electron Transfer: Theory and Experiment
The development of classical, semi-classical and quantum mechanical electron transfer models is described. In addition, the course will examine recent experimental results and the application of electron transfer theory to biological systems.

CHEM 5400 [0.25 credit] (CHM 8305)
Synthesis Methods
Discussion of modern reactions and reagents and their development. Modern methods such as Evans enolates, catalytic processes, organometallic methods. Combination of methods for the preparation of complex molecules and building blocks.

CHEM 5401 [0.25 credit] (CHM 8328)
Applications of Organometallic Chemistry to Synthesis
Modern chemistry depends heavily on organometallic methods, many of which have become catalytic and involve metals such as Cu, Pd, Pt, Mo, Cr, Ru. Various applications will be discussed including Stille coupling, Heck reaction, ring-closing metathesis.

CHEM 5402 [0.25 credit] (CHM 8329)
Medicinal Chemistry
Preparation of drugs, their mode of action, their use in treating of disease. The evolution of medicine due to chemistry. Discussion of metabolic pathways and their modification to control and/or circumvent disease.

CHEM 5403 [0.25 credit] (CHM 8319)
Total Syntheses
The philosophy and strategy development for complex syntheses will be discussed along with modern reagents and reactions that have shortened classical routes and lead to more efficient and atom economy.

CHEM 5404 [0.25 credit] (CHM 8330)
Heteroatoms
The focus will be on heterocycles. Reactivity of these heterocycles and their use for drugs and applications for the total synthesis particularly of alkaloids. Included in this survey will be an extensive examination of carbohydrate chemistry and other important oxygen heterocycles.

CHEM 5405 [0.25 credit] (CHM 8320)
Pericyclic and Stereoelectronic Effects
Pericyclic reactions, facial selectivity, stereoelectronic effects in carbohydrates and related acetal cleavage. Applications to complex synthetic problems.

CHEM 5406 [0.5 credit] (CHM 8164)
Organic Polymer Chemistry
Basic principles of industrial and synthetic polymers. Polymerization and polymer characterization. Selected topics to cover some important polymers with emphasis on the synthesis, commodity plastics, engineering thermoplastics and specialty polymers. Also

offered at the undergraduate level, as CHEM 4204, for which additional credit is precluded. Prerequisites: CHEM 3201 and CHEM 3202 and/or CHEM 4203 or the equivalent. Students should have a basic knowledge of organic reaction mechanisms and stereochemistry.

CHEM 5407 [0.5 credit] (CHM 8134)
Spectroscopy for Organic Chemists
Analysis of proton NMR spectra. Fourier transform 13C NMR, strategies for structure elucidation, relaxation times, two-dimensional NMR. Aspects of mass spectrometry. Also offered at the undergraduate level, with different requirements, as CHEM 4202, for which additional credit is precluded.

CHEM 5408 [0.25 credit] (CHM 8350)
Introduction to Polymer Structure and Morphology
Flexible and rigid rod polymers: effect of molecular constitution and conformation; examples of polymer architectures and function; the amorphous state and glass transition; the crystalline state: typical crystal structures of polymers; polymorphism; crystallinity and long spacing. Thermal and solvent-induced crystallization; Lamellar and Spherulitic morphology.

CHEM 5409 [0.25 credit] (CHM 8351)
Morphology of Polymers and Composites
Liquid crystalline state of polymers; morphology of block copolymers and polymer blends; plasticizers and fillers for tailoring properties; depression of glass transition and melting temperature; phase stability of polymer composites; mechanical properties; self assembled systems; polymer nano-composites for electronic devices; common experimental techniques.

CHEM 5500 [0.25 credit] (CHM 8348)
Analytical Instrumentation
Principles of modern electronics, devices and instruments. Measurement of photonic and electrochemical signals. Conditioning of signals for feedback control and microcomputer interfacing. Computational data analysis techniques such as simplex optimization. Applications in chemical analysis include amperometric detector for capillary electrophoresis, and surface plasmon resonance immunosensor.

CHEM 5501 [0.25 credit] (CHM 8352)
Analytical Approach to Chemical Problems
Case study of analytical approach to various chemical problems in agricultural, biochemical, environmental, food processing, industrial, pharmaceutical and material sciences. Analytical methods include capillary electrophoresis, chemiluminescence, Fourier transform infrared spectroscopy, inductively coupled plasma emission spectroscopy, mass spectrometry, biochemical sensors, and fibre optics for remote sensing.

CHEM 5502 [0.5 credit] (CHM 8353)
Trace and Ultratrace Analytical Chemistry
Criteria for evaluation and selection of analytical techniques and methods. Electroanalytical techniques. Simultaneous and sequential multielement determination. Atomic absorption, atomic emission and atomic fluorescence spectrometry, using optical spectrometric and mass-spectrometric determination. Applications of these techniques at trace and ultratrace levels in complex matrices.

CHEM 5503 [0.5 credit] (CHM 8354)
Chemical Speciation in the Natural Environment
Metal-organic interactions in the aquatic environment. Evaluation of analytical techniques and their capability for quantitative determination of chemical species (as opposed to total element-determination) in the natural environment. Electrochemical techniques for determination of chemical speciation of nutrient and toxicant elements present in the natural environment.

CHEM 5504 [0.25 credit] (CHM 8314)
Surface Chemistry Aspects of Electrochemical Science
Introduction to electrode processes and electrolysis. Potential differences at interfaces. Characterization of the electrical double layer. Dipole orientation effects, charge-transfer in adsorbed layers, electrochemical origins of surface science concepts. Theory of electron transfer, electrode kinetics, electrocatalysis.

CHEM 5505 [0.25 credit] (CHM 8315)
Electrochemical Surface Science
Introduction to advanced in-situ techniques in electrochemistry: Scanning probe microscopy, Raman, infrared and laser spectroscopy.
Prerequisites: CHEM 5504 (CHM 8141)

CHEM 5506 [0.25 credit] (CHM 8316)
Surface Chemistry
Adsorption phenomena and isotherms, surface areas of solids. Modern techniques in surface chemistry and surface science such as electron diffraction, Auger electron spectroscopy, photoelectron spectroscopy, electron energy loss spectroscopy, infrared and Raman spectroscopy. Current new techniques.

CHEM 5507 [0.25 credit] (CHM 8312)
Applications of Thermochemistry to Chemical Problems
Deals with the measurement of and interrelationship between molecular, radical and ionic enthalpies and their relevance to bond strengths and chemical reactivity.

CHEM 5508 [0.25 credit] (CHM 8313)
Ion Structures in Organic Chemistry
This course is focused on the significance of structure on the generation and behaviour of organic cations and anions in gaseous and condensed phases.

CHEM 5509 [0.25 credit] (CHM 8334)
Novel Organic and Inorganic Molecules and Radicals
Topics to be covered will be centred on neutralization-reionization techniques as well as flash pyrolysis and matrix isolation studies.

CHEM 5600 [0.25 credit] (CHM 8323)
Quantum Mechanical Methods - Theory
A course dealing with the theory behind quantum mechanical methods (HF, MP2, CI, DFT).

CHEM 5601 [0.25 credit] (CHM 8324)
Quantum Mechanical Methods - Applications
A computational chemistry course dealing with practical applications of methods taught in CHM 8171 such as thermochemistry, reaction pathway modeling, structure predictions.
Prerequisites: CHM 8171

CHEM 5602 [0.25 credit] (CHM 8344)
Computational Approaches in Medicinal Chemistry
Theory and application of methods used in the pharmaceutical industry including molecular mechanics.

CHEM 5603 [0.25 credit] (CHM 8345)
Molecular Energy Transfer
Principles of energy transfer during non-reactive molecular collisions as deduced from experiment and theory, mostly in the gas phase. Translational, rotational, vibrational and electronic energies are discussed.

CHEM 5604 [0.25 credit] (CHM 8336)
Non-Equilibrium Kinetics
Gas phase chemical kinetics of elementary and complex reaction mechanisms, as seen from a microscopic viewpoint. Unimolecular and bimolecular reactions under conditions of non-Boltzmann energy distributions. Consequences for combustion and atmospheric chemistry, as well as for fundamental kinetics.

CHEM 5605 [0.25 credit] (CHM 8337)
Non-Linear Chemical Kinetics
Principles of non-linear dynamics as applied to very complex chemical reaction mechanisms containing feedback processes. Monotonic, oscillatory, and chaotic dependence of concentrations on time. Gas phase and liquid phase reactions.

CHEM 5705 [0.5 credit] (CHM 9109)
Ecotoxicology
Concepts of ecotoxicology, emphasizing whole ecosystem response to hazardous contaminants. The focus is the impacts of chronic and acute exposure of ecosystems to toxicants, the methods of pesticide, herbicide and pollutant residue analysis and the concept of bound residues. (Also listed as BIOL 6403 [BIO 9104].)
Prerequisite: BIOL 6402 (BIO 9101)/CHEM 5708 (CHM 8156).

CHEM 5708 [0.5 credit] (CHM 8156)
Principles of Toxicology
This course identifies the basic theorems of toxicology with examples of current research problems. Toxic risk is defined as the product of intensive hazard and research problems. Each factor is assessed in scientific and social contexts and illustrated with many types of experimental material. (Also listed as BIOL 6402 [BIO 9101].)

CHEM 5709 [0.5 credit] (CHM 8157)
Chemical Toxicology
An introduction to modeling chemical hazards and exposures at the cellular level. The properties of toxic substances are compared to the responses of enzymatic systems. These interactions are defined as Quantitative Structure-Activity Relationships and used to interpret hazardous materials under regulations such as WHMIS. (Also listed as BIOL 5709 [BIO 8113].)
Prerequisite: BIOL 6402/CHEM 5708 (BIO 9101/ CHM 8156).

CHEM 5801 [1.0 credit] (CHM 8256)
Seminar I
A seminar course in which students are required to present a seminar on a topic not related to their research program. In addition, students are required to attend the seminars of their fellow classmates and actively participate in the discussion following the seminar.

CHEM 5802 [1.0 credit] (CHM 8257S)
Seminar II
A seminar course in which students are required to present a seminar on their Ph.D. research topic in their research program. In addition, students are required to attend the seminars of their fellow classmates and actively participate in the discussion following the seminar.

CHEM 5805 [1.0 credit] (CHM 8167)
Seminar in Toxicology
This course introduces the seminar format and involves student, faculty and invited seminar speakers. The student will present a seminar and submit a report on a current topic in toxicology. (Also listed as BIOL 6405.)

CHEM 5900 [0.5 credit] (CHM 8158)
Directed Special Studies
Under unusual circumstances and with the recommendation of the research supervisor, it is possible to engage in directed study on a topic of particular value to the student. This may also be used for credit if there are insufficient course offerings in a particular field.

CHEM 5901 [0.25 credit] (CHM 8304)
Advanced Topics in Organic Chemistry
Topics of current interest in organic chemistry. The content of this course may vary from year to year.

CHEM 5902 [0.25 credit] (CHM 8302)
Advanced Topics in Inorganic Chemistry
Topics of current interest inorganic chemistry. The content of this course may vary from year to year.

CHEM 5903 [0.25 credit] (CHM 8309)
Advanced Topics in Physical/Theoretical Chemistry
Topics of current interest in physical/theoretical chemistry. The content of this course may vary from year to year.

CHEM 5909 (CHM 7999)
M.Sc. Thesis

CHEM 6909 (CHM 9999)
Ph.D. Thesis

Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology

Room 2240 Herzberg Building
Telephone: (613) 520-3515
Fax: (613) 520-2569

The Program

Coordinator of the Collaborative Program, B.R. Hollebone, Department of Chemistry, Carleton University

Associate Coordinator of the Collaborative Program, Jules Blais, Department of Biology, University of Ottawa

Toxicology is the study of the effects of poisons on living systems. These poisons can be inorganic, synthetic, or natural organic materials. As a field of research, toxicology cuts across traditional disciplinary boundaries such as chemistry, biology. While individual researchers usually specialize in a particular area, toxicologists today must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of other disciplines. To meet this challenge, Carleton University and the University of Ottawa offer a multidisciplinary Collaborative Program in Chemical and Environmental Toxicology as a Specialization in Toxicology of the Master of Science degree offered in the two joint Institutes: The Ottawa-Carleton Institute of Biology, which consists of the Departments of Biology at Carleton University and the University of Ottawa: The Ottawa-Carleton Chemistry Institute, which consists of the Departments of Chemistry at Carleton University and the University of Ottawa.

The Collaborative Program is coordinated by a committee of representatives of these participating units. The Program is intended to focus the research and training which the student receives through either of these Institutes onto the specific, interdisciplinary problems of toxicology. The student is responsible for fulfilling the requirements of both the Master of Science degree in the chosen Institute and the additional requirements of the Collaborative Program. The Master of Science degree awarded will specify the discipline of the Institute, with the additional annotation of the Specialization in Chemical and Environmental Toxicology.

To enter the Program, students would first apply directly to the Institute that is most appropriate to their research interests. Once accepted into this chosen Institute, students may then apply to the Collaborative Program to undertake relevant course work and research for the Specialization in Toxicology. Further information can be obtained from the Coordinator or Associate Coordinator or the Directors or Associate Directors of the Biology or Chemistry Institutes.

List of Coordinators and Members of the Collaborative Program in Chemical and Environmental Toxicology

Coordinator of the Collaborative Program, D. Lean, Department of Biology, University of Ottawa

Associate Coordinator of the Collaborative Program, B.R. Hollebone, Department of Chemistry, Carleton University

Members of the Collaborative Program

- Arnason, J.T., Ph.D., *Plant Secondary Chemicals, Plant-insect Interactions*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Bawagan, A.D.O., Ph.D., *Physical Chemistry*, Ottawa-Carleton Chemistry Institute, Carleton University

- Blais, J., Ph.D., *Environmental Toxicology*, Ottawa-Carleton Institute of Biology

- Burk, R., Ph.D., *Environmental Analytical Chemistry*, Ottawa-Carleton Chemistry Institute, Carleton University

- Chakrabarti, C.L., Ph.D.,D.Sc., *Environmental Toxicology*, Ottawa-Carleton Chemistry Institute, Carleton University (Distinguished Research Professor)

- Charest, C., Ph.D., *Plant Eco-Physiology*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Findlay, C.S., Ph.D., *Modeling of toxicant transport*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Gardner, D.R., Ph.D., *Pesticide-nerve Interactions*, Ottawa-Carleton Institute of Biology, Carleton University

- Hollebone, B.R., Ph.D., *Chemical Toxicology*, Ottawa-Carleton Chemistry Institute, Carleton University

- Kennedy, S.W., Ph.D., *Environmental Toxicology*, Ottawa-Carleton Institute of Biology, University of Ottawa (Adjunct)

- Lai, E.P.C., Ph.D., *Analytical Chemistry*, Ottawa-Carleton Chemistry Institute, Carleton University

- Lambert, I.B., Ph.D., *Genetic Toxicology, Biochemistry*, Ottawa-Carleton Institute of Biology, Carleton University

- Lean, D.R.S., Ph.D., *NSERC Industrial Chair in Ecotoxicology*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Miller, J.D., Ph.D., *Environmental Toxicology of Natural Toxins*, Ottawa-Carleton Chemistry Institute, Carleton University

- Mineau, P., Ph.D., *Adjunct Professor, Wildlife and Pesticide Toxicology*, Ottawa-Carleton Institute of Biology, Carleton University

- Mitchel, R.E.J., Ph.D., *Radiation Toxicology*, Ottawa-Carleton Institute of Biology, University of Ottawa (Adjunct)

- Moon, T.W., Ph.D., *Comparative Physiology, Biochemistry*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Philogene, B.J.R., Ph.D., *Insect Physiology, Chemical Ecology*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Pick, F.R., Ph.D., *Aquatic Sciences, Microbial Ecology*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Scaiano, J.C., Ph.D., *Physical Organic Chemistry, Photochemistry*, Ottawa-Carleton Chemistry Institute, University of Ottawa

- Scott, S.L., Ph.D., *Surface Chemistry, Kinetics*, Ottawa-Carleton Chemistry Institute, University of Ottawa

- Trudeau, V.L., Ph.D., *Physiology and Toxicology of Reproduction*, Ottawa-Carleton Institute of Biology, University of Ottawa

- Wigfield, D.C., Ph.D., *Chemical Toxicology*, Ottawa-Carleton Chemistry Institute, Carleton University

- Wyndham, R.C., Ph.D., *Molecular Microbial Ecology*, Ottawa-Carleton Institute of Biology, Carleton University

Master's Program

Admission Requirements

Admission to the Collaborative Program in Chemical and Environmental Toxicology, leading to the Specialization in Toxicology of the Master of Science in Biology or Chemistry is considered after the student has been admitted to the Master of Science program of one of the participating Institutes. Acceptance is normally based on:

- A high honours GPA in the undergraduate degree or in graduate course work.

- A letter of recommendation from a faculty member participating in the Collaborative Program, which both recommends admission and indicates the willingness of the faculty member to supervise and sponsor the candidate's research program in a relevant field of chemical and /or environmental toxicology.

Program Requirements

Students must fulfil the Master of Science degree requirements for the Institute in which they are enrolled. To qualify for the additional Specialization of the degree, the following specific courses are required:

- BIOL 6402/CHEM 5708 (BIO 9101/CHM 8156)(0.5 credit)

- BIOL 6405/CHEM 5805 (BIO 9105/CHM 8167)(0.5 credit)

- One additional Toxicology course (0.5 credit) chosen from:

- BIOL 6403 (BIO 9104)

- CHEM 5709 (CHM 8157)

- One course approved by the Coordinator or Associate Coordinator (0.5 credit)

Other courses offered in the programs of the primary Institutes may be taken as options, with the permission of the student's supervisory committee, in addition to these basic requirements of the Collaborative program in Chemical and Environmental Toxicology. As necessary, the Institute may also direct the student to take or audit additional courses to complement background knowledge.

The student is also required to present a research thesis on a topic in a relevant aspect of chemical or environmental toxicology. This relevance must be identified clearly in the written thesis.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers (in parentheses) follow the Carleton course number and credit information.

Other courses listed in the calendar under the primary academic units of psychology, biology, or chemistry may be taken, with the approval of the student's supervisory committee, as options in addition to the basic requirements of the degree in chemical and environmental toxicology.

BIOL 6402 [0.5 credit] (formerly 61.642) /
CHEM 5708 (BIO 9101/CHM 8156)
Principles of Toxicology
This course identifies the basic theorems of
toxicology with examples of current research
problems. Toxic risk is defined as the product
of intensive hazard and extensive exposure.
Each factor is assessed in scientific and social
contexts and illustrated with many types of
experimental material.

BIOL 6403 [0.5 credit] (formerly 61.643)/
CHEM 5705 (BIO 9104/CHM 9109)
Ecotoxicology
Concepts of ecotoxicology, emphasizing whole
ecosystem response to hazardous
contaminants. The focus is the impacts of chronic
and acute exposure of ecosystems to toxicants,
the methods of pesticide, herbicide and
pollutant residue analysis and the concept of
bound residues.
Prerequisite: BIOL 6402/CHEM 5708 (BIO 9101/
CHM 8156).

BIOL 6405 [0.5 credit] (formerly 61.645)/
CHEM 5805 (BIO 9105/CHM 8167)
Seminar in Toxicology
This course introduces the seminar format and
involves student, faculty and invited seminar
speakers. The student will present a seminar
and submit a report on a current topic in
toxicology.

BIOL 5709 [0.5 credit] (formerly 61.579)/
CHEM 5709 (BIO 8113/CHM 8157)
Chemical Toxicology
An introduction to modeling chemical hazards
and exposures at the cellular level. The
properties of toxic substances are compared to
the responses of enzymatic systems. These
interactions are defined as Quantitative
Structure-Activity Relationships and used to
interpret hazardous materials under regulations
such as WHMIS.
Prerequisite: BIOL 6402/CHEM 5708 (BIO 9101/
CHM 8156).

CHEM 5403 [0.5 credit] (formerly 65.543)
(CHM 8112)
Methods of Analytical Chemistry
This course describes the criteria used in
choosing the best analytical technique for
specific problems including, accuracy, precision,
sensitivity, linearity, detection limits,
interferences and the commercial availability of
suitable instrumentation for analysis by atomic
spectroscopy, electro-chemistry, chroma-
tography, molecular spectrometry and mass
spectrometry.

Ottawa-Carleton Institute for Civil Engineering

Université d'Ottawa
University of Ottawa

Carleton University

Carleton University
Minto 3091, 1125 Colonel By Drive
Ottawa, ON K1S 5B6
Canada
Email: ocice@carleton.ca
Telephone: (613) 520-5659
Fax: (613) 520-5682

Application packages available at:
www.gs.carleton.ca/kits/index.html

Information relating to program requirements:
www.ocice.ca

The Institute

Director of the Institute, J.L. Humar

Associate Director of the Institute, N.J. Gardner

Established in 1984, the Institute combines the research strengths and resources of the Departments of Civil and Environmental Engineering at Carleton University and the Department of Civil Engineering at the University of Ottawa. Programs leading to a Master of Engineering, a Master of Applied Science, and Ph.D. degrees are available through the Institute in a wide range of fields of civil engineering. Programs in transportation engineering, and in water resources engineering are centred at Carleton University and the University of Ottawa, respectively. Programs in environmental, geotechnical, and structural engineering are available at both universities. Graduate students may pursue their research on either university campus, depending upon the choice of program and supervisor. Registration will be at the university to which the student's supervisor is affiliated. Requests for admission may be sent to the Director of the Institute. Graduate studies in Environmental Engineering are also available through the Ottawa-Carleton Institute for Environmental Engineering which offers graduate degrees in Environmental Engineering (www.ociene.ca).

Members of the Institute

The "home" department of each member is indicated by (C) for the Department of Civil and Environmental Engineering at Carleton University and (O) for the Department of Civil Engineering at the University of Ottawa.

- A.O. Abd El Halim, *Transportation Management, Airport Design and Planning,*

Engineering Economics, Management Pavements and Materials, (C)

- A. A. Al Bakri, *Transportation* (C – Adjunct)

- Kazimierz Adamowski, *Hydrology, Stochastic and Statistical Analyses* (O)

- John Adjeleian, *Structures, Building Design & Construction* (C - Professor Emeritus)

- A. Baskaran, *Building Science, Computational Fluid Dynamics* (O - Adjunct)

- G.E. Bauer, *Geotechnical Engineering, Soil Improvement, Earth Retaining Structures, In-Situ Testing* (C - Adjunct)

- J.J. Beaudoin, *Cement Chemistry, Strength of Composite Materials* (O - Adjunct)

- D.W.R. Bell, *Transportation, Engineering Economics and Policy, Airport Planning* (C - Adjunct)

- Mark Bomberg, *Building Materials* (C - Adjunct)

- M. Bruneau, *Steel Structures, Earthquake Engineering, Computer-Aided Design* (O-Adjunct)

- Pascale Champagne, *Environmental Engineering, Passive Treatment Systems, Acid Mine Drainage (AMD) Mitigation, Composting and Solid Waste Management* (C)

- M.S. Cheung, *Finite Element Analysis, Bridge Engineering* (C/O - Adjunct)

- S.E. Chidiac, *Heritage Structures, Durability, Mathematical Modeling* (C - Adjunct)

- R.L. Droste, *Environmental Engineering, Water and Wastewater Treatment* (O)

- S.M. Easa, *Highway Geometry, Reliability Concept, Planning* (C - Adjunct)

- Erman Evgin, *Finite Elements, Soil Plasticity, Environmental Geomechanics* (O)

- G.Y. Felio, *Performance and Rehabilitation of Urban Infrastructure, Water Distribution System* (C - Adjunct)

- Leta Fernandes, *Environmental Engineering, Agricultural Waste Management* (O)

- S. Fou, *Seismic Risk Assessment and Management* (O - Adjunct)

- R. Frenette, *Water Resources* (O)

- N.J. Gardner, *Structures, Reinforced Concrete, Earthquake Engineering, Construction Loads* (O)

- V.K. Garga, *Geotechnical Engineering, Dams, Harbours, Heavy Foundations* (O)

- Lisa Graham, *Environmental Engineering, Mobile and Stationary Source Emissions*, (C – Adjunct)

- G.V. Hadjisophocleous, *Fire Safety Engineering, Fire Risk Analysis, Fire Modeling* (C)

- G.A. Hartley, *Structural Analysis, Finite Elements, Boundary Elements* (C)

- Yasser Hassan, *Transportation Planning and Technology, Geometric Design, Traffic Safety, Winter Maintenance* (C)

- N.M. Holtz, *Computer-Aided Structural Engineering* (C)

- J.L. Humar, *Structures, Earthquake Engineering, Computer-Aided Design* (C)

- W.F. Johnson, *Urban Transportation Planning and Management* (C - Adjunct)

- Deniz Karman, *Environmental Engineering, Motor Vehicle Emissions and Urban Air Quality* (C)

- K.J. Kennedy, *Environmental Engineering, Waste Water Treatment* (O)

- A.M. Khan, *Transportation, Systems Planning, Engineering and Management* (C)

- Heng-Aik Khoo, *Behaviour of Pipelines, Structural Steel Connections, Constitutive Relationships of Material Properties, Composite Materials* (C)

- D.T. Lau, *Earthquake Engineering, Experimental and Numerical Methods for Modeling of Structures, Performance Assessment and Field Monitoring of Bridges, Liquid Storage Tank Design* (C)

- K.T. Law, *Geotechnical Engineering, Landslide Study, In-Situ Testing, Geoseismic Hazards* (C)

- J.R. Mehaffey, *Fire Protection Engineering* (C - Adjunct)

- E.H.H. Mohamed, *Transportation Engineering, Pavement and Materials* (C - Adjunct)

- M.E. Mohareb, *Structural Engineering* (O)

- R.M. Narbaitz, *Solid Waste Management, Ground Water Contamination* (O)

- Nove Naumoski, *Earthquake Engineering* (O – Adjunct)

- S. S. F. Ng, *Structures, Numerical Methods, Dynamic Behaviour* (O – Professor Emeritus)

- W.J. Parker, *Environmental Engineering, Waste Water Treatment, Fate of Contaminants in Engineered and Natural Systems, Biological Processes* (C)

- G.G. Patry, *Wastewater Treatment Process Simulation and Control* (O)

- B.N. Persaud, *Transportation, Traffic Engineering, Highway Safety* (C - Adjunct)

- A.G. Razaqpur, *Concrete, Finite Elements, Fibre Reinforced Polymers, Bridges* (C)

- Murat Saatcioglu, *Building Structures, Reinforced Concrete, Earthquake Analysis and Design* (O)

- J.J. Salinas, *Building Structures, Wood Engineering, Structural Reliability* (C)

- E.J. Schiller, *Environmental Engineering, Water Supply and Irrigation* (O)

- A.P.S. Selvadurai, *Geotechnical Engineering, Continuum Mechanics, Applied Mathematics* (C - Adjunct)

- L.A.Y. Shallal, *Transportation, Planning and Management, Traffic Engineering* (C - Adjunct)

- Siva Sivathayalan, *Geotechnical Earthquake Engineering, Constitutive Relations, Liquefaction, Laboratory Testing, Geofoams and Geotextiles, Static and Dynamic Behaviour of Soils* (C)

- Yvan Soucy, *Structural Dynamics, Modal Testing and Vibration-Based Health Monitoring* (C - Adjunct)

- T.S. Sridhar, *Environmental Impact Assessment, Wastewater Treatment, Hazardous and Radioactive Waste, Pollution Control* (C)

- G.T. Suter, *Structural Engineering, Masonry Structures* (C - Adjunct)

- O.J. Svec, *Geomechanics, Pavement Materials, Numerical Methods* (C - Adjunct)

- Hiroshi Tanaka, *Structures, Wind Engineering* (O)

- D.R. Townsend, *Water Resource Engineering, Applied Hydraulics, River Engineering* (O)

- S.K. Vanapailli, *Design and Construction of Waste Management Structures and Critical State Soil Mechanics* (O - Adjunct)

- P.J. Van Geel, *Environmental Engineering, Groundwater Flow and Contaminant Transport, Waste Disposal* (C)

- M.A. Warith, *Environmental Engineering* (C/O - Adjunct)

Master's Degree

Admission Requirements

The normal requirement for admission to a master's program is a bachelor's degree with at least high honours standing in civil engineering.

1. Graduates from engineering programs other than civil engineering, or Honours science

programs with a mathematics content equivalent to the civil engineering program will have to take a minimum of four qualifying undergraduate civil engineering courses in their area of graduate specialty.

2. Graduates from other science programs will have to take all the core engineering undergraduate mathematics courses in addition to the requirements specified in (1) above.

The undergraduate courses required will be specified in the Certificate of Admission.

Undergraduate civil engineering courses will not be accepted towards a graduate degree. Graduate students may still be required to take undergraduate courses for credit to fulfil the admission requirements.

No more than one half of the program credit requirements or that stipulated in the regulations of the university in which the student is registered, whichever is less, can be transferred at admission. At least one half of the course work must be taken at the Institute.

Program Requirements

Study at the master's level can be pursued through either a thesis leading to an M.A.Sc. or a project and course work option leading to an M.Eng. At Carleton University, 1.0 credit typically comprises three hours of lectures or seminars a week for two terms, or the equivalent. At the University of Ottawa, 1.0 credit is one hour of instruction per week for one term.

Requirements are stated in terms of Carleton University credits.

The requirements for the master's degree by thesis (M.A.Sc.) are:

- Three (3.0) course credits

- Thesis equivalent to three (3.0) course credits

- Participation in the civil engineering seminar series

- Successful oral defence of the thesis

The requirements for the master's degree by course work (M.Eng.) are:

- Four and a half (4.5) course credits

- A project equivalent to one and a half (1.5) course credits

Doctor of Philosophy

Admission Requirements

The normal requirement for admission into the Ph.D. program is a master's degree with thesis in civil engineering. Students who have been admitted to a master's program may be permitted to transfer into the Ph.D. program if they show outstanding academic performance and demonstrate significant promise for advanced research.

Program Requirements

At Carleton University, 1.0 credit typically comprises three hours of lectures or seminars a week for two terms, or the equivalent. At the University of Ottawa, 1.0 credit is one hour of instruction per week for one term.

Requirements are stated in terms of Carleton University credits.

- A minimum of two and a half (2.5) course credits

- Participation in the civil engineering seminar series

- Successful completion of written and oral comprehensive examinations in subject areas determined by the student's advisory committee

- Successful completion of a thesis proposal examination

- Thesis

- Successful oral defence of the thesis. The examination board for all theses will include an external examiner, and, when possible, professors from both departments.

- Subject to approval of his/her advisory committee, a Ph.D. student may take, or be required to take, courses in other disciplines.

Students who have been permitted to transfer into the Ph.D. program from a master's program without having completed the master's degree will require five (5.0) course credits for the Ph.D. degree which include transfer of credits from the incompleted master's program.

Graduate Courses

In all programs, the student may choose graduate courses from either university with the approval of the adviser or the advisory committee. Graduate courses are listed below, grouped by subject area. Course descriptions may be found in the departmental section of the calendar concerned. All courses are of one term duration. The codes given in parentheses are those used by the University of Ottawa. Courses beginning with "CIVE" and "ENVE" are offered at Carleton University and those beginning with "CIVJ" and "ENVJ" are offered at the University of Ottawa. Not all courses listed are necessarily given during one academic year.

Geotechnical and Soils
CIVE 5209 (CVG 7100)

CIVE 5300 (CVG 7101)

CIVE 5500 (CVG 7104)

CIVE 5501 (CVG 7105)

CIVE 5502 (CVG 7106)

CIVE 5503 (CVG 7107)

CIVE 5504 (CVG 7108)

CIVE 5800 – CIVE 5804 (CVG 7305-7309)

(CVG 5100) CIVJ 5000 Deep Foundations

(CVG 5103) CIVJ 5003 Dam Engineering

(CVG 5106) CIVJ 5006 Site Improvements

(CVG 5108) CIVJ 5008 Pile Dynamics

(CVG 5171) CIVJ 5102 Strength and Deformation Behaviour of Soil and Rock

(CVG 5174) CIVJ 5104 Soil Plasticity

(CVG 5177) CIVJ 5107 Offshore Geotechnique

(CVG 5178) CIVJ 5108 Ice Mechanics

Structural Engineering
CIVE 5101 (CVG 7120)

CIVE 5102 (CVG 7121)

CIVE 5103 (CVG 7122)

CIVE 5104 (CVG 7123)

CIVE 5105 (CVG 7124)

CIVE 5106 (CVG 7137)

CIVE 5200 (CVG 7138)

CIVE 5203 (CVG 7125)

CIVE 5204 (CVG 7126)

CIVE 5205 (CVG 7127)

CIVE 5206 (CVG 7128)

CIVE 5208 (CVG 7130)

CIVE 5600 (CVG 7131)

CIVE 5601 (CVG 7140)

CIVE 5602 (CVG 7141)

CIVE 5605 (CVG 7143)

CIVE 5606 (CVG 7144)

CIVE 5607 (CVG 7145)

CIVE 5608 (CVG 7146)

CIVE 5705 – CIVE 5709 (CVG 7300-7304)

(CVG 5142) CIVJ 5201 Advanced Structural Dynamics

(CVG 5143) CIVJ 5202 Advanced Structural Steel Design

(CVG 5144) CIVJ 5300 Advanced Reinforced Concrete Design

(CVG 5145) CIVJ 5203 Theory of Elasticity

(CVG 5146) CIVJ 5302 Numerical Methods of Structural Analysis

(CVG 5147) CIVJ 5204 Theory of Plates and Shells

(CVG 5148) CIVJ 5305 Prestressed Concrete Design

(CVG 5150) CIVJ 5206 Advanced Concrete Technology

(CVG 5153) CIVJ 5209 Wind Engineering

(CVG 5155) CIVJ 5306 Earthquake Engineering

(CVG 5156) CIVJ 5301 Finite Element Methods I

(CVG 5157) CIVJ 5303 Finite Element Methods II

(CVG 5158) CIVJ 5307 Elements of Bridge Engineering

(CVG 5154) CIVJ 5308 Random Vibrations

(CVG 5159) CIVJ 5309 Long Span Structures

Transportation
CIVE 5303 (CVG 7103)

CIVE 5304 (CVG 7150)

CIVE 5305 (CVG 7151)

CIVE 5306 (CVG 7152)

CIVE 5307 (CVG 7153)

CIVE 5308 (CVG 7154)

CIVE 5309 (CVG 7155)

CIVE 5401 (CVG 7156)

CIVE 5402 (CVG 7159)

CIVE 5403 (CVG 7158)

CIVE 5805– CIVE 5809 (CVG 7310 – 7314)

Water Resources
(CVG 5111) CIVJ 5501 Hydraulic Structures

(CVG 5119) CIVJ 5803 Computational Hydraulics

(CVG 5120) CIVJ 5506 Water Resources Systems

(CVG 5122) CIVJ 5508 Groundwater and Seepage

(CVG 5123) CIVJ 5509 Advanced Topics in Hydrology

(CVG 5125) CIVJ 5601 Statistical Methods in Hydrology

(CVG 5126) CIVJ 5602 Stochastic Hydrology

(CVG 5127) CIVJ 5603 Hydrologic Systems Analysis

(CVG 5128) CIVJ 5604 Water Resources Planning and Policy

(CVG 5131) CIVJ 5606 River Engineering

(CVG 5135) CIVJ 5608 Water Supply and Sanitation in Developing Countries

(CVG 5140) CIVJ 5607 Irrigation and Drainage

Environmental
ENVE 5001 (CVG 7160)

ENVE 5101 (EVG 7101)

ENVE 5102 (CVG 7161)

ENVE 5103 (CVG 7162)

ENVE 5104 (EVG 7104)

ENVE 5201 (EVG 7201)

ENVE 5202 (EVG 7202)

ENVE 5203 (CVG 7164)

ENVE 5301 (EVG 7301)

ENVE 5302 (CVG 7163)

ENVE 5303 (EVG 7303)

ENVE 5401 (EVG 7401)

ENVE 5402 (EVG 7402)

(CVG 5130) ENVJ 5900 Wastewater Treatment Process Design

(CVG 5132) ENVJ 5901 Unit Operations of Water Treatment

(CVG 5133) ENVJ 5906 Solid Waste Disposal

(CVG 5134) ENVJ 5907 Chemistry for Environmental Engineering

(CVG 5135) ENVJ 5608 Water Supply and Sanitation in Developing Countries

(CVG 5136) CIVJ 5904 Water and Wastewater Treatment Laboratories

(CVG 5137) CIVJ 5905 Water and Wastewater Treatment Process Analysis

(CVG 5179) ENVJ 5908 Anaerobic Digestion

(CVG 5180) ENVJ 5909 Biological Nutrient Removal

(CVG 6315) ENVJ 6002 Sludge Processing, Utilization, and Disposal

Directed Studies and Seminars
CIVE 5906 (CVG 6108)

CIVE 5907 (CVG 6109)

CIVJ 6000 (CVG 6300) - CIVJ 6003 (CVG 6399) Advanced Topics

Projects and Theses
CIVE 5900

CIVE 5909

CIVE 6909

(CVG 6000) Civil Engineering Report

(CVG 7999) M.A.Sc.Thesis

(CVG 9998) Comprehensive Exam (Ph.D.)

(CVG 9999) Ph.D. Thesis

Civil and Environmental Engineering

Mackenzie Building 3432
Telephone: (613) 520-5784
Fax: (613) 520-3951
Email: Civil Engineering
ocice@carleton.ca
Environmental Engineering
ociene@carleton.ca
Web site: cee.carleton.ca

The Department

Chair of the Department, W.J. Parker

Departmental Supervisor of Graduate Studies, P.J. Van Geel

In addition to University and Graduate Faculty regulations, all Engineering departments share common procedures that are described in Section 18 of the General Regulations of this Calendar.

The Department of Civil and Environmental Engineering offers programs of study and research leading to the Master's and Ph.D. degrees in Civil Engineering and Environmental Engineering. The M.A.Sc. degree is awarded for a Master's degree by thesis and the M.Eng. degree is awarded for Master's degree by project and coursework. Civil Engineering degrees are offered through the Ottawa-Carleton Institute for Civil Engineering, which is jointly administered by the Department of Civil and Environmental Engineering at Carleton University and the Department of Civil Engineering at the University of Ottawa. Environmental Engineering degrees are offered through the Ottawa-Carleton Institute for Environmental Engineering, which is jointly administered by the Department of Civil and Environmental Engineering at Carleton University, the Department of Civil Engineering at the University of Ottawa, and the Department of Chemical Engineering at the University of Ottawa.

The Department conducts research and has developed graduate programs in the following areas:

Environmental Engineering

The program in environmental engineering offers opportunities for research in a wide range of topics. Current graduate research in environmental engineering is primarily directed towards the following areas:

Air Pollution
Air quality issues in microenvironments, emissions from mobile sources, receptor modeling, transport and fate of vapours and particulates, dispersion modeling, indoor air quality, innovative treatment technologies for contaminated air streams.

Environmental Impact Assessment
Environmental impact assessment, risk assessment, identification and quantification of contaminant exposure pathways, uncertainty related to these processes, technical issues and the important contributions of environmental engineers to this complex multi-disciplinary process.

Management of Solid, Hazardous, and Radioactive Waste, and Pollution Prevention
Reduction of waste streams through improved manufacturing processes and waste diversion programs, minimization of the impact of long-term disposal of solid hazardous and radioactive wastes, waste disposal alternatives, landfill design and landfill leachate and gas management strategies.

Water and Wastewater Treatment
Study of innovative treatment technologies for water and wastewater treatment, fate of VOCs in municipal and industrial waste streams, treatment of effluents from various industries, passive treatment systems for mitigation of acid mine drainage, enhanced UV oxidation processes.

Water Resources Management, Groundwater Management and Contaminant Transport
Quantification and protection of existing water resources, hydrogeology, processes impacting contaminant migration, natural attenuation of contaminants in groundwater impacted by landfill leachate, petroleum hydrocarbons and chlorinated solvents, unsaturated and multiphase environments, site characterization and remediation.

Geotechnical Engineering

The graduate program in geotechnical engineering places an emphasis on both theoretical and applied problems related to soil and rock mechanics and foundation engineering. These generally include the study of mechanical properties of soil and rock materials, stability of natural slopes and earth embankments, soil-foundation-structure interaction, and problems in foundation design and geomechanics. Broader programs in geotechnical engineering may be arranged by making use of courses offered in the Department of Geography at Carleton University and in the Department of Civil Engineering at the University of Ottawa.

Graduate research in geotechnical engineering is primarily directed towards the following areas:

Bearing Capacity and Settlement
Problems related to design of bridge abutments and footings located on sloped granular fill, experimental and field studies.

Design and Analysis of Pipelines in Permafrost Regions
Development and use of advanced finite element techniques in the study of frost heave and its effect on the stresses and deformations of chilled gas pipelines buried in discontinuous permafrost.

Earth Retaining Structures
Experimental and analytical studies of anchored and braced excavations, flexible and rigid retaining walls, soil reinforcement, tunnels and conduits, field behaviour.

In-Situ Testing of Soils
The use of devices such as the pressuremeter, the screw plate test, the borehole shear device, and borehole dilatometer in the assessment of geotechnical properties of soils.

Mechanical Behaviour
Development of constitutive relations for soils and rock masses with yield and creep characteristics; applications to foundation engineering.

Performance of Anchors
Theoretical and experimental analysis of deep and shallow anchors in soil, rock and concrete; group action; creep effects; prestress loss.

Reinforced Soil Systems
Characterization of the material properties and reinforcement-soil interaction problems comprising geogrids and geotextiles. Extensive facilities for tension, creep, pull-out and interface shear testing of geosynthetics are available.

Soil-Foundation Interaction
Elastic and consolidation effects of soil-foundation interaction; soil-frame interaction; contact stress measurement; performance of rigid and flexible foundations; buried pipelines.

Structural Engineering

The graduate program in structural engineering embodies a broad spectrum of topics involving material behaviour, structural mechanics and analysis, and the behaviour and design of buildings, bridges, and other types of structures, including liquid storage tanks, dams, and buried pipe systems, etc. These topics are in the following fields: computer applications in structural analysis; structural dynamics, seismic analysis, earthquake engineering; finite element analysis; structural systems and design optimization; behaviour and design of steel, concrete, composite, timber and masonry structures; construction economics; and bridge engineering. Graduate research in structural engineering is primarily directed towards the following areas:

Behaviour and Design of Steel, Concrete and Composite Structures
Analytical and experimental studies of structural members, substructures, and connections for buildings, bridges, and offshore structures. Development of the corresponding limit states design format design rules.

Bridge Engineering
Analysis and design of concrete and steel bridges against traffic, wind and earthquake loads; bridge planning and management; innovative numerical modeling and techniques for static and dynamic analysis of complex and long-span bridges; seismic reliability and performance assessment of bridges; seismic retrofit of bridge structures; 3D dynamic analysis of vehicle bridge deck interaction.

Computer Applications in Structural Design
Development of knowledge-based systems for the analysis, design, detailing, fabrication, and erection of buildings and bridges. Includes graphic interfaces, pre- and post-processing of frame analysis, load determination, and finite element analysis packages.

Fibre Reinforced Polymers (FRP)
Analysis and laboratory testing of structural members and systems reinforced, retrofitted or repaired with FRP. Development of design rules and code provisions for FRP reinforced/repaired structures. The research encompasses all aspects of FRP applications in structures, including bridges, buildings, pipes and tanks. Advanced numerical modeling and large scale testing are integral components of the research program.

Fire Safety Engineering
Fire Safety Engineering offers opportunities for research in various areas of fire safety including fire modeling, fire risk analysis, smoke movement, fire resistance and occupant response and evacuation.
• Fire modeling
  Modeling fire development in compartments. Characterization of design fires, heat release rate and production of toxic gases, development of fire related properties of materials.
• Smoke movement
  Development of two zone models for calculating movement of smoke through a building. Full-scale experiments to study impact of smoke control and smoke management techniques.
• Fire risk analysis
  Development of tools to calculate risk from fires to building occupants. Frequency evaluation and consequence of fire scenarios. Reliability and uncertainty analysis.
• Fire resistance
  Evaluating the impact of fire attack on building elements through computer modeling and full-scale testing. Development of probabilities of failure of building elements when subjected to realistic fires.
• Occupant response and evacuation
  Studies aimed at characterizing occupant characteristics, occupant response to emergencies, and occupant evacuation.

Masonry Behaviour and Design
Study of strength and serviceability issues by means of theoretical approaches, testing, and fieldwork.

Materials Durability
Research on the durability of concrete, masonry, FRP and reinforcing steel. Both laboratory experimentation and numerical techniques are used to develop predictive models for practical applications.

Monitoring and Evaluation of Structures
Behaviour and performance of bridges, buildings, and other structures; field and laboratory monitoring techniques; instrumentation; data processing and interpretation.

Numerical Modeling of Buildings and Bridges
Advanced analytical Modeling of reinforced and prestressed concrete, steel, and composite concrete-steel buildings and bridges. Material and geometric non-linearities, bond-slip, the advent and propagation of cracks, tension stiffening, and shear-connectors behaviour are modeled to predict the full response of structures up to failure.

Seismic Analysis and Design
Seismic response of buildings; computer analyses of linear and nonlinear structural response; design of buildings for seismic forces; development of code provisions for seismic design; seismic behaviour of liquid storage tanks and dams; fluid structures interaction problems.

Timber Structures
Analysis, design, and performance evaluation of wood-structured systems and components; structural reliability.

Transportation Planning and Technology

The graduate program in transportation planning and technology deals with problems of policy, planning, economics, design, and operations in all modes of transportation. In the area of transportation planning, the focus is on the design of transport systems, including terminals, modeling and simulation, urban and regional studies, traffic engineering and geometric design. In the transportation technology area, programs deal with technology of vehicles and facilities, acoustics and noise, materials and pavement design. Graduate research in transportation is currently focused on the following areas:

Asphalt Concrete
Research on asphalt concrete, including compaction, rutting, thermal stresses, stripping, and reinforced asphalt systems. Novel compaction techniques and equipment, and in-situ asphalt testing equipment have been developed and patented.

Geometric Design
Modeling of roadway alignments; three-dimensional analysis; computer animation and simulation; vehicle characteristics and capabilities; effect of driver perception and behaviour.

Planning and Design Methodology
Development and application of models for optimization of transport supply; transportation system management.

Traffic Safety
Areas of high collision risk; reducing collision risk through better design and consideration of human factors; design consistency and relation to traffic safety.

Transport Policy
Assessment and impact analysis of national, regional, and urban transportation policies.

Transportation Terminals
Airport planning, air terminal design; bus, rail, subway terminal design, layout methods, pedestrian traffic.

Transportation Technology Development and Assessment
Modernization of passenger and freight rail services; soil properties; pavement design, multi-layered systems, low temperature cracking of pavements, thermo-mechanical modeling of fracture processes in pavements; highway design, energy and emissions.

Travel and Traffic Analysis
Behavioural theories of passenger travel, goods movement; empirical traffic studies.

Winter Maintenance
Controlling snow and ice accumulation on the roadway surface; criteria for quality of maintenance activities; anti-icing practice; environmental impacts; effect of deicing chemicals on pavements; new technologies and materials.

Departmental Facilities

The structures laboratory facility includes an 11 m x 27 m strong floor with a clear height of 11 m; a strong pit, measuring 3 m x 3.7 m x 6.6 m for geotechnical and highway material testing; a 400,000 lb. universal testing machine with auxiliary equipment for load and displacement control; numerous hydraulic actuators; test frames; specialized equipment for torsion and impact studies; and a wide selection of measurement devices (strain gauges, LVDTs, pressure transducers, load cells, thermocouples) and several data acquisition systems for testing structural materials and components. The concrete laboratory has facilities for the casting, curing, and testing of reinforced concrete members. Laboratory facilities in geotechnical engineering include both large scale and conventional tri-axial testing, consolidation testing, pore water pressure measurements, and model studies of contact stress measurements. The soil dynamics and highway materials laboratories provide facilities

for studies of the physical properties of soil, stabilized soil, aggregate and bituminous mixtures, reinforced soil systems and geosynthetics.

The environmental engineering laboratories comprise a total space of 170 square meters with excellent facilities for bench scale chemical and biochemical experiments. Analytical equipment and sensors are available for air, water and soil sample testing and analyses. A laboratory specially equipped with four fume hoods is available for conducting research involving volatile and hazardous substances.

Computer-related equipment within the department comprises networks of SUN workstations and PC-based workstations and related peripherals. The computing centre of the University provides access to additional computing resources such as mainframe computers and multi-processor SUN workstations. A library of computer programs in structural, geotechnical, transportation, and environmental engineering provides a significant resource for advanced study and research.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured . The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers (in parentheses) follow the Carleton course number and credit information.

All courses listed are one-term courses and may be offered in either fall or winter with the exception of projects and theses.

Civil Engineering Courses

CIVE 5101 [0.5 credit](formerly 82.511) (CVG 7120)
Introductory Elasticity
Stresses and strains in a continuum; transformations, invariants; equations of motion; constitutive relations, generalized Hooke's Law, bounds for elastic constant: strain energy, superposition, uniqueness; formulation of plane stress and plane strain problems in rectangular Cartesian and curvilinear coordinates, Airy-Mitchell stress functions and Fourier solutions.

CIVE 5102 [0.5 credit] (formerly 82.512) (CVG 7121)
Advanced Elasticity
Continuation of topics introduced in CIVE 5101. Complex variable solutions: torsional and thermal stresses; axially symmetric three-dimensional problems, Love's strain potential, Boussinesq-Galerkian stress functions; problems related to infinite and semi-infinite domains. Introduction to numerical methods of stress analysis, comparison of solutions.
Prerequisite: CIVE 5101 or permission of the Department.

CIVE 5103 [0.5 credit] (formerly 82.513) (CVG 7122)
Finite Element Analysis 1
Stress-strain and strain-displacement relationships from elasticity. Plane stress and plane strain finite elements. Lagrange interpolation and Lagrange based element families. Theory of thin plates; overview of plate bending elements. Theory of shells; practical shell elements. Finite element methods formulation. Also offered at the undergraduate level, with different requirements, as CIVE 4201, for which additional credit is precluded.

CIVE 5104 [0.5 credit] (formerly 82.514) (CVG 7123)
Earthquake Engineering
Advanced vibration analysis techniques; Rayleigh-Ritz procedure; subspace iteration; derived Ritz coordinates; proportional and non-proportional damping; introduction to seismology; earthquake response analysis via time and frequency domain; response spectrum approach; multiple input excitations; design considerations and code requirements; other advanced topics in earthquake engineering.
Prerequisite: CIVE 5106 or permission of the Department.

CIVE 5105 [0.5 credit] (formerly 82.515) (CVG 7124)
Finite Element Analysis 2
Variational and Galerkin formulations: assumed displacement, assumed stress and hybrid elements; plate bending: convergence, completeness and conformity, patch test, Kirchhoff and Mindlin plate theories, nonlinear elasticity and plasticity; geometric non-linearity, Eulerian and Lagrangian formulations; incremental and iterative schemes, finite elements in dynamics.
Prerequisite: CIVE 5103 or permission of the Department.

CIVE 5106 [0.5 credit] (formerly 82.516) (CVG 7137)
Dynamics of Structures
Structural dynamics, single and multi-degree-of-freedom systems, formulation of equations of motion, methods of analytical mechanics, free

and forced vibrations, normal mode analysis, numerical methods for the response analyses of single and multiple-degree-of-freedom systems.

CIVE 5200 [0.5 credit] (formerly 82.520) (CVG 7138)
Masonry Behaviour and Design
Properties of masonry materials and assemblages. Behaviour and design of walls, columns and lintels. Treatment of specialized design and construction topics. Design of lowrise and highrise structures. Discussion of masonry problems. Emphasis throughout the course is placed on a practice-oriented approach. Also offered at the undergraduate level, with different requirements, as CIVE 4403, for which additional credit is precluded.

CIVE 5203 [0.5 credit] (formerly 82.523) (CVG 7125)
Theory of Structural Stability
Elastic and inelastic behaviour of beam-columns; elastic and inelastic buckling of frames; application of energy methods to buckling problems; lateral-torsional buckling of columns and beams; buckling of plates; local buckling of columns and beams.
Prerequisite: CIVE 5205 or equivalent.

CIVE 5204 [0.5 credit] (formerly 82.524) (CVG 7126)
Advanced Steel Structures
Limit states design philosophy; material behaviour; tension members; plate buckling; torsion; lateral torsional buckling; beams, axially loaded columns and beam-column behaviour; brittle fracture and fatigue; frame stability and second order effects.

CIVE 5205 [0.5 credit] (formerly 82.525) (CVG 7127)
Advanced Structural Analysis
Matrix structural analysis; force and displacement method of analysis for planar and space structures; symmetric and anti-symmetric structures; analysis of nonlinear structures: geometric and material nonlinearities; large displacement theory and iteration strategy.

CIVE 5206 [0.5 credit] (formerly 82.526) (CVG 7128)
Prestressed Concrete
Prestressed concrete materials; working stress design for flexure; ultimate strength design for flexure, shear, and torsion; prestress losses; deflection and camber; slabs; indeterminate beams and frames; introduction to prestressed bridges and circular tanks.

CIVE 5208 [0.5 credit] (formerly 82.528) (CVG 7130)
Advanced Reinforced Concrete
The research background, development, and limitations in current building code provisions for reinforced concrete; yield line theory of slabs; safety and limit state design; computer design of concrete structures.

CIVE 5209 [0.5 credit] (formerly 82.529) (CVG 7100)
Geotechnical Case Studies
The critical study of case histories relating to current procedures of design and construction in geotechnical engineering. The importance of instrumentation and monitoring field behaviour will be stressed. In-situ testing.

CIVE 5300 [0.5 credit] (formerly 82.530) (CVG 7101)
Advanced Soil Mechanics
Effective stress, pore pressure parameters, saturated and partially saturated soils; seepage; permeability tensor, solutions of the Laplace equation; elastic equilibrium; anisotropy, non-homogeneity, consolidation theories; shear strength of cohesive and cohesionless soils; failure and yield criteria.

CIVE 5303 [0.5 credit] (formerly 82.533) (CVG 7103)
Pavements and Materials
An analysis of the interaction of materials, traffic, and climate in the planning, design construction, evaluation, maintenance, and rehabilitation of highway and airport pavements.

CIVE 5304 [0.5 credit] (formerly 82.534) (CVG 7150)
Intercity Transportation
Current modal and intermodal issues, including energy. Framework and process of intercity transport planning and management. Recent trends and system development. Passenger and freight demand and service characteristics. Future prospects and possibilities.

CIVE 5305 [0.5 credit] (formerly 82.535) (CVG 7151)
Traffic Engineering
Introduction to principles of traffic engineering. Basic characteristics of drivers, vehicles, and traffic. Volume, speed, and delay studies. Traffic stream characteristics and queuing theory. Capacity analysis of roads and intersections. Safety.

CIVE 5306 [0.5 credit] (formerly 82.536) (CVG 7152)
Highway Materials
Materials characterization and strength evaluation of soils, stabilized soils, aggregates, and asphalt concrete. Effects of low temperatures and frost on materials behaviour.

CIVE 5307 [0.5 credit] (formerly 82.537) (CVG 7153)
Urban Transportation
Urban transportation systems, planning and management. Urban development models, an introduction. Urban transportation policy.

CIVE 5308 [0.5 credit] (formerly 82.538) (CVG 7154)
Geometric Design
Basic highway geometric design concepts. Vertical and horizontal alignment. Cross-sections. Interchange forms and design.

Adaptability and spacing of interchanges. Design of operational flexibility; operational uniformity, and route continuity on freeways.

CIVE 5309 [0.5 credit] (formerly 82.539) (CVG 7155)
Transportation Supply
Advanced treatment of transportation planning and management concepts and techniques: transport supply issues, capacity and costs, evaluation of system improvements and extensions, transportation and development, policy impact analysis.

CIVE 5401 [0.5 credit] (formerly 82.541) (CVG 7156)
Transportation Economics
Transportation, economic analysis framework. Transport industry output. Carrier operations. Issue of resource utilization, measurement, economics, supply of infrastructure, pricing; subsidies, externalities. Transport policy in Canada.

CIVE 5402 [0.5 credit] (formerly 82.542) (CVG 7159)
Transportation Terminals
Framework for passenger terminal planning and design. Theory: the transfer function and network modeling; pedestrian flow characteristics; capacity of corridors, stairs, escalators, and elevators; layout planning. Practical applications: air, rail, metro, bus, ferry, and multi-modal terminals.

CIVE 5403 [0.5 credit] (formerly 82.543) (CVG 7158)
Airport Planning
Framework for airport planning and design. Aircraft characteristics; demand forecasting; airport site selection; noise, airside capacity; geometric design; the passenger terminal complex; cargo area; general aviation; ground transportation; land use planning.

CIVE 5500 [0.5 credit] (formerly 82.550) (CVG 7104)
Earth Retaining Structures
Approaches to the theoretical and semi-empirical analysis of earth retaining structures. Review of the earth pressure theories. Analysis and design methods for rigid and flexible retaining walls, braced excavations, and tunnels. Instrumentation and performance studies.

CIVE 5501 [0.5 credit] (formerly 82.551) (CVG 7105)
Foundation Engineering
Review of methods of estimating compression and shear strength of soils. Bearing capacity of shallow and deep foundations. Foundations in slopes. Pile groups. Use of in-situ testing for design purposes.

CIVE 5502 [0.5 credit] (formerly 82.552) (CVG 7106)
In-Situ Geotechnique
Subsurface exploration program. Soil and rock sampling. Geo-physical methods. Mechanical and hydraulic properties of soil and rock. Determination of strength and deformability. Critical evaluation of vane, pressuremeter, screw plate, dilatometer, borehole shear and plate load tests. Pumping, recharge and packer tests. In-situ stress measurements.

CIVE 5503 [0.5 credit] (formerly 82.553) (CVG 7107)
Num. Methods in Geomechanics
Advanced theories of soil and rock behaviour. Plasticity models. Generalized failure criteria. Critical state and cap models. Dilatancy effects. Associative and non-associative flow rules. Hardening rules. Consolidation, visco-elasticity, creep behaviour. Finite element formulation. Iterative schemes. Time marching schemes. Solution of typical boundary value problems. Prerequisite: CIVE 5101, CIVE 5103, or permission of the Department.

CIVE 5504 [0.5 credit] (formerly 82.554) (CVG 7108)
Seepage through Soils
Surface-subsurface water relations. Steady flow. Flownet techniques. Numerical techniques. Seepage analogy models. Anisotropic and layered soils. Water retaining structures. Safety against erosion and piping. Filter design. Steady and non-steady flow towards wells. Multiple well systems. Subsidence due to ground water pumping.
Precludes additional credit for ENVE 5301.

CIVE 5600 [0.5 credit] (formerly 82.560) (CVG 7131)
Project Management
Managing building development, design, and construction including interrelationships among owners, developers, financing sources, designers, contractors, and users; project manager role and tasks; project objectives; feasibility analyses; budgets and financing; government regulations; environmental and social constraints; cost, time, and content quality controls and processes; human factors.

CIVE 5601 [0.5 credit] (formerly 82.561) (CVG 7140)
Eng. Stats. and Probabilities
Review of basic concepts in statistics and probabilities. Bayes' Theorem. Distributions. Parameter estimation. Goodness-of-fit. Regression and correlation. OC curves. Monte Carlo simulation. ANOVA. Probability-based design criteria. System reliability. Selected applications in structures, transportation and geomechanics. Use of computer software. Emphasis on problem solving.

CIVE 5602 [0.5 credit] (formerly 82.562) (CVG 7141)
Advanced Computer-Aided Design
Representation and processing of design constraints (such as building codes and other design rules); decision tables; constraint

satisfaction. Automatic integrity and consistency maintenance of design databases; integrated CAD systems. Introduction to geometric modeling. Introduction to artificial intelligence. Also offered at the undergraduate level, with different requirements, as CIVE 4500, for which additional credit is precluded.

CIVE 5605 [0.5 credit] (formerly 82.565) (CVG 7143)
Design of Steel Bridges
Basic features of steel bridges, design of slab-on-girder, box girder and truss bridges. Composite and non-composite design. Introduction to long span suspension and cable-stayed bridges. Discussion of relevant codes and specifications.

CIVE 5606 [0.5 credit] (formerly 82.566) (CVG 7144)
Design of Concrete Bridges
Concrete and reinforcing steel properties, basic features of concrete bridges, design of superstructure in reinforced concrete slab, slab-on-girder and box girder bridges, an introduction to prestressed concrete bridges, design of bridge piers and abutments. In all cases the relevant provisions of Canadian bridge codes are discussed.

CIVE 5607 [0.5 credit] (formerly 82.567) (CVG 7145)
Introduction to Bridge Design
Limit states design of highway bridges; methods of analysis, design and evaluation procedures of superstructure components; design codes; design loads and load factors; concrete deck design; load distributions; computer analysis; impact and dynamics; fatigue and brittle fracture; construction bracing; load capacity rating of existing bridges.

CIVE 5608 [0.5 credit] (formerly 82.568) (CVG 7146)
Intro. to Fire Protection Eng.
Introduction to basic chemistry and physics of fire; fire growth and fire severity in buildings; simple models for the prediction of the course of a building fire; reaction of building components to exposure by fire; design of fire safe buildings.

CIVE 5705-CIVE 5709 [0.5 credit] (formerly 82.579-82.579) (CVG 7300-7304)
Topics in Structures
Courses in special topics related to building design and construction, not covered by other graduate courses; details will be available some months prior to registration.

CIVE 5800-CIVE 5804 [0.5 credit] (formerly 82.580 - 82.584) (CVG 7305-7309)
Topics in Geotechnique
Courses in special topics in geotechnical engineering, not covered by other graduate courses; details will be available some months prior to registration.

CIVE 5805-CIVE 5809 [0.5 credit] (formerly 82.585 - 82.589) (CVG 7310 - 7314)
Topics in Transportation
Courses in special topics in transportation engineering, not covered by other graduate courses; details will be available some months prior to registration.

CIVE 5900 [1.5 credit] (formerly 82.590)
Civil Engineering Project
Students enrolled in the M.Eng. program by course work will conduct an engineering study, analysis, or design project under the general supervision of a member of the Department.

CIVE 5906 [0.5 credit] (formerly 82.596)
Directed Studies 1

CIVE 5907 [0.5 credit] (formerly 82.597)
Directed Studies 2

CIVE 5909 (formerly 82.599)
M.A.Sc. Thesis

CIVE 6909 (formerly 82.699)
Ph.D. Thesis

Environmental Engineering Courses

ENVE 5001 [0.5 credit] (formerly 81.501 and 82.570) (CVG 7160)
Biofilm Processes
Physical and chemical properties of biofilms. Microbial ecology of biofilms. Biofilm processes, attachment, growth, sloughing. Transport and interfacial transfer phenomena; mass transfer models, mass transport in biofilms, deposition of solids. Modeling biofilm systems; single and multiple species models, mass balance equations, boundary conditions, moving boundary problem, analytical and numerical solutions. Case studies.

ENVE 5101 [0.5 credit] (formerly 81.511) (EVG 7101)
Air Pollution Control
Air quality and pollution; definitions, measurement and monitoring methods. Criteria pollutants, air toxics, particulate matter, secondary pollutants. Pollutant formation mechanisms. Major sources and control methods. Meteorology and principles of dispersion modeling. Principles of receptor modeling. Indoor air quality.

ENVE 5102 [0.5 credit] (formerly 81.512 and 82.571) (CVG 7161)
Traffic-Related Air Pollution
Pollutant formation, emission characterization, emission control technology and emission modeling from motor vehicles. Dispersion and receptor modeling for conservative pollutants in urban microenvironments. Personal exposure and health risk assessment.

ENVE 5103 [0.5 credit] (formerly 81.513 and 82.572) (CVG 7162)
Air Quality Modeling
Dispersion modeling for simple and complex sources and complex terrain. Physical and chemical transformations for pollutants in the atmosphere. Urban and regional air pollution modeling for reactive pollutants. The urban air shed model. Regional air quality modeling case studies.

ENVE 5104 [0.5 credit] (formerly 81.514) (EVG 7104)
Indoor Air Quality
Indoor air quality as a component of the indoor environment; physical and chemical parameters for characterization. Types and sources of indoor air pollution, measurement techniques. Heating, ventilation, and air conditioning practices and issues. The human factor in identifying and controlling indoor air pollution.

ENVE 5201 [0.5 credit] (formerly 81.521) (EVG 7201)
Geo-Environmental Engineering
Landfill design; hydrogeologic principles, water budget, landfill liners, geosynthetics, landfill covers, quality control and quality assurance, clay/leachate interaction, composite liner design and leachate collection systems. Landfill operation, maintenance and monitoring. Case studies of landfill design and performance. Design of environmental control and containment systems; slurry walls, grout curtains.

ENVE 5202 [0.5 credit] (formerly 81.522) (EVG 7202)
Contaminant Fate Mechanisms
Mechanisms and chemical properties influencing the fate of toxic contaminants in environmental systems; liquid-gas partitioning and mass transfer, liquid-solid partitioning, abiotic and biotic degradation of toxics. Fate of toxics in wastewater collection and treatment systems. Treatment of residual streams; sludges, air streams. Mechanisms influencing the fate of toxic contaminants in aquatic and subsurface environments.

ENVE 5203 [0.5 credit] (formerly 81.523) (CVG 7164)
Hazardous & Radioactive Wastes
Classification of hazardous, radioactive and mixed wastes, hazardous waste treatment processes, wastes generated in the nuclear fuel cycle, radioactive waste classification, radioactive waste treatment and management of residuals, engineered systems for long-term isolation and disposal, mixed waste management.

ENVE 5301 [0.5 credit] (EVG 7301) (formerly 81.531)
Contaminant Hydrogeology
Theory of flow through porous media; soil characterization, soil properties, anisotropy, heterogeneity. Contaminant transport. Well hydraulics and pump tests. Introduction to numerical modeling; finite difference, finite elements, conceptual model, boundary conditions. Site remediation and remediation technologies.

ENVE 5302 [0.5 credit] (formerly 81.532 and 82.573) (CVG 7163)
Case Studies in Hydrogeology
Development of a conceptual model; chemistry, geology and hydrology, site characterization, initial and boundary conditions. Application of industry-recognized computer codes to model flow and contaminant transport at a particular site. Evaluation of remedial alternatives at a site. Modeling of the more common remediation technologies (soil vapour extraction, air sparging, pump and treat, biodegradation).

ENVE 5303 [0.5 credit] (formerly 81.533) (EVG 7303)
Multiphase Flow in Soils
Theory of unsaturated flow and multiphase flow; capillary pressure-saturation relationships, relative permeability relationships, wettability, hysteresis, fluid entrapment, residual saturations, governing equations for flow and transport. Richard's Equation for unsaturated flow. Modeling of multiphase flow.

ENVE 5401 [0.5 credit] (formerly 81.541) (EVG 7401)
Env. Impacts of Major Projects
Regulatory framework and impact assessment requirements for project approvals, survey of the components of the EIA process and methodology, the review process, public participation in environmental decision-making, preparation of the EIA document, case studies of major engineering projects.

ENVE 5402 [0.5 credit] (formerly 81.542) (EVG 7402)
Finite Elements in Field Problems
Use of the Galerkin and Ritz finite element formulations to solve one and two dimensional field problems related to environmental, civil and mechanical engineering. Steady state and time-dependent phenomena involving heat transfer, fluid flow, diffusion, and dispersion will be treated with an emphasis on practical applications. Requires a basic knowledge of third year-level undergraduate engineering mathematics and physics.

ENVE 5800 [0.0 credit] (formerly 81.580) (EVG 7800)
Master's Seminar
The series consists of presentations by graduate students or external speakers. Graduate students in the Environmental Engineering program are required to participate in these seminar series by attending all seminars and making at least one presentation during their graduate studies.

ENVE 5900 [1.5 credit]
(formerly 81.590)
Environmental Engineering Project
Students enrolled in the M.Eng. program by
course work will conduct an engineering study,
analysis, or design project under the general
supervision of a member of the Department.

ENVE 5906 [0.5 credit] (formerly 81.596)
(EVG 6108)
Directed Studies 1
Precludes additional credit for CIVE 5906.

ENVE 5907 [0.5 credit] (formerly 81.597).
(EVG 6109)
Directed Studies 2
Precludes additional credit for CIVE 5907.

ENVE 5909 (formerly 81.599)
Master's Thesis

ENVE 6909 (formerly 81.699)
Ph.D. Thesis

ENVE 7800 [0.0 credit] (formerly 81.780)
(EVG 7801)
Ph.D. Seminar
The series consists of presentations by graduate
students or external speakers. Graduate
students in the Environmental Engineering
program are required to participate in these
seminar series by attending all seminars and
making at least one presentation during their
graduate studies.

Other Courses of Particular Interest

Mechanical and Aerospace Engineering
MECH 5104, MECH 5107, MECH 5201, MECH
5500, MECH 5601, MECH 5602, MECH 5608

Systems and Computer Engineering
SYSC 5001

Geography
GEOG 4107 Geotechnical Mechanics

GEOG 5302, GEOG 5303, GEOG 5304

Public Administration
PADM 5100, PADM 5101

Cognitive Science

Institute of Interdisciplinary Studies
Dunton Tower 2216
Telephone: (613) 520-2368
Fax: (613) 520-3985
Email: iis@carleton.ca

The Institute

Director of the Institute, Andrew Brook

Director of the Cognitive Science Doctoral Program, Andrew Brook

The Institute of Interdisciplinary Studies offers a program of study and research leading to the degree of Doctor of Philosophy in Cognitive Science.

The School of Computer Science and the Departments of Psychology, Linguistics and Applied Language Studies, and Philosophy participate in the doctoral program.

The program offers two fields of study:

* language and cognition

* representation and learning

The field of language and cognition includes the following sub-fields: linguistic theory, psycholinguistics, linguistic methodology, philosophy of language, the mind's processing of language, acquisition of language and other symbolic systems, memory and language, text analysis, computational linguistics, natural language processing, and alternative architectures.

The field of representation and learning includes the following sub-fields: the mind's cognitive resources and how it uses them, memory, vision, attention, the psychophysics and neural foundations of cognition, philosophical theories of representation, history of cognitive science, evolutionary approaches to cognition, knowledge representation, computer simulations of memory constraints, expert systems, case-based systems, genetic algorithms, heuristic theorems, neural networks, support systems for cognitive processes, and machine learning

Members of the Cognitive Science Doctoral Program

- Andrew Brook, *Philosophy of Mind and Language, Kant, History of Cognitive Science*

- Murray Clarke, *Philosophy of Mind* (Concordia - Adjunct)

- Jean-Pierre Corriveau, *Natural Language Processing, Time-constrained Memory and Text Comprehension*

- Bruno Emond, *Artificial Intelligence* (University of Quebec at Hull - Adjunct)

- Babak Esfandiari, *Agent-based Systems, Symbolic Machine Learning, Algorithms and Heuristics*

- Helen Goodluck, *Language Acquisition and Processing* (Ottawa - Adjunct)

- Chris Herdman, *Word Recognition, Phonemic and Lexical Processing, Attention and Word Recognition*

- Marie-Odile Junker, *Conceptual Semantics, Semantics of Quantifiers*

- J.B. Kelly, *Sensory Neuroscience and Related Issues in the Biological Foundations of Cognition*

- W.R. Lalonde, *Artificial Intelligence, Connectionism, Cerebral Computation*

- Ann Laubstein, *Speech-production Models, Phonology, Speech Recognition Algorithms*

- Jo-Anne Lefevre, *Numerical and Lexical Cognition*

- John Logan, *Spoken Language Perception, History of Cognitive Science*

- Stephen Marsh, *Distributed Artificial Intelligence* (NRC – Adjunct)

- Stanislas Matwin, *Symbolic Machine Learning* (Ottawa - Adjunct)

- John F. Meech, *Intelligent Agents, User Interface Agents, Adaptive and Intelligent Agents* (NRC – Adjunct)

- Martin Montminy, *Philosophy of Mind, Philosophy of Language* (Ottawa - Adjunct)

- Franz Oppacher, *Genetic Approaches to Cognition, Genetic Algorithms, Natural Language and Knowledge-based Systems, Machine Learning, Computational Linguistics*

- Lise Paquet, *Visual Perception*

- W.M. Petrusic, *Psychophysics of Cognition Science*

- Charles Reiss, *Linguistics* (Concordia - Adjunct)

- Monique Sénéchal, *Vocabulary Acquisition*

- Robert Stainton, *Philosophy of Language and Linguistics, Pragmatics and Semantics*

- Lew Stelmach, *Vision and Attention* (Communication Research Centre) (Adjunct)

- Stanislas Szpakowicz, *Computational Linguistics, Knowledge Acquisition, Decision Support Systems* (Ottawa - Adjunct)

- Andre Vellino, *Artificial Intelligence* (Nortel - Adjunct)
- Robert West, *Cognitive Modeling, Human-Computer Interface*
- Helmut Zobl, *Knowledge Representation, Second-language Acquisition and Processing*

Admission Requirements

The requirements for admission into the Ph.D. program is a master's degree (or the equivalent) from one of the participating disciplines, an Honours degree from a participating discipline, a combined Honours degree (or the equivalent) from two of the participating disciplines or an Honours degree in cognitive science. Students with an Honours bachelor's degree from another discipline with a significant focus on cognition may also apply.

Normally, a substantial proportion of an applicant's work will have been in natural and/or artificial cognition.

Applicants with a master's degree are normally admitted to a 10.0 credit program while applicants with a bachelor's degree are admitted to a 15.0 credit program.

Students who are eligible for admission to the 10.0 credit program but who have deficiencies may be required to take additional courses. In some circumstances, these students will be admitted to the 15.0 credit program.

An average of A- or better in relevant courses is normally required.

Applicants whose first language is not English must demonstrate a fluent knowledge of English. This is normally satisfied by passing a TOEFL test with a score of 580 or better. (See the Proficiency in English section in the General Regulations of this Calendar.)

Before admission, a candidate must submit a description of his or her proposed area of thesis research and a member of the core faculty must indicate in writing that he or she is willing to supervise the student.

Program Requirements

Program requirements for the Ph.D. degree are outlined in the General Regulations section of this Calendar.

All doctoral students must successfully complete:

- CGSC 6800 (1.0 credit);
- 2.0 credits in the area of cognition from the course offerings of at least three of the four participating academic units and other than those offered by the cognitive science program;

- CGSC 6900 (1.0 credit);
- CGSC 6905 (1.0 credit);
- a second language if required (see below);
- a thesis (equivalent to 5.0 credits) which must be defended at an oral examination.

In addition, students in the 15.0 credit doctoral program in cognitive science must successfully complete:

- CGSC 5001, CGSC 5002, CGSC 5003 and CGSC 5004;
- PSYC 5200;
- 2.0 credits in the area of cognition at the 5000- and 6000-level, chosen from the course offerings of at least three of the four participating academic units.

To enter the final 10.0 credits of the program, students must complete these courses with B+ or better. Students with a strong background in any of these required areas may apply to be exempted.

Any student planning to complete a dissertation with an applied cognitive emphasis is required to work for at least one term at a facility approved by the student's research supervisor and the Director of the Cognitive Science Program. Such a facility may include any institution, governmental laboratory, corporation, hospital or educational centre that is conducting research in the area of the student's specialization. Students should complete this work while registered in either the Comprehensive Examination (CGSC 6905) or the Ph.D. Thesis (CGSC 6909).

Comprehensive Examinations

The comprehensive examination consists of three parts. Each part must be completed in a different participating discipline (Psychology, Computer Science, Linguistics and Applied Language Studies or Philosophy). Under special circumstances another discipline may be substituted.

The purpose of the comprehensive examination is to provide a student with background in a number of approaches to cognition adequate for his or her thesis.

The comprehensive examination is graded as Passed with Distinction/Satisfactory/Unsatisfactory. If any part is graded Unsatisfactory, the student may resubmit the final assignment only one time.

As part of preparation for the comprehensive examination, the student must spend one term in a laboratory or other research venue in each of the three chosen disciplines.

Thesis

A thesis committee is created prior to completion of the comprehensive examination. The committee is comprised of the thesis supervisor, one faculty member from outside the department, one other member of the core faculty and the director of the program, ex *officio*.

Normally students will conduct the research for their thesis in the research facilities of their supervisor.

A thesis proposal, prepared in accordance with the guidelines of the thesis supervisor's discipline, must be defended at an oral examination.

The thesis must be defended at an oral examination.

Residence Requirement

All Ph.D. candidates must be registered full-time in a minimum of six terms to satisfy the residence requirement (nine terms in the case of a 15.0 credit program).

Language Requirement

A second language is required when relevant to the student's program of research. Whether a second language is required and the level of proficiency expected will be determined at the time of admission based on the student's description of his or her proposed area of thesis research.

Guidelines for Completion of the Ph.D. Degree

All students must complete CGSC 6800 and normally will complete the required 2.0 credits within three terms of beginning the final 10.0 credits of the program. CGSC 6900 must be completed within six terms of beginning the final 10.0 credits of the program.

The first part of the comprehensive examination must be completed by the end of the fourth term after beginning the 10.0 credit program or the final 10.0 credits of the 15.0 credit program. The remaining two parts must be completed within an additional two terms.

Students in the 10.0 credit doctoral program will normally complete the degree in twelve terms of full-time study. Students in the 15.0 credit doctoral program will normally complete the degree in fifteen terms of full-time study.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Area Seminars

The purpose of an area seminar is to offer an advanced survey of one of the four participating disciplines.

CGSC 5001 [0.5 credit] (formerly 07.501)
Cognition and Artificial Cognitive Systems
An introduction to the contribution of artificial intelligence and computer modeling of cognitive processes to cognitive science. (Also listed as COMP 5100.)

CGSC 5002 [0.5 credit] (formerly 07.502)
Experimental Research in Cognition
An introduction to the contribution of experimental psychology and neuroscience to cognitive science. (Also listed as PSYC 5700.)

CGSC 5003 [0.5 credit] (formerly 07.503)
Cognition and Language
An introduction to the contribution of theoretical linguistics and linguistic research to cognitive science.

CGSC 5004 [0.5 credit] (formerly 07.504)
Cognition and Conceptual Issues
An introduction to the contribution of philosophy of mind, philosophy of language, and other conceptual investigations to cognitive science. (Also listed as PHIL 5200.)

Core Seminars

CGSC 6800 [1.0 credit] (formerly 07.680)
Proseminar in Cognitive Science
An intensive survey of the central problems and issues of natural and artificial cognition and a brief examination of contemporary neuroscience. Compulsory in the first year of the final 10.0 credits. Students are required to complete the proseminar in the first year of registration.

CGSC 6900 [1.0 credit] (formerly 07.690)
Research Seminar in Cognitive Science
A full-credit seminar course devoted to the research of students, faculty, and guests of the cognitive science doctoral program. Normally a different researcher will present each week. Compulsory in the second year of the final 10.0 credits. Students in other years are expected to attend on a regular basis.

CGSC 6901 [0.5 credit] (formerly 07.691)
Directed Studies in Cognitive Science I

CGSC 6902 [0.5 credit] (formerly 07.692)
Directed Studies in Cognitive Science II

CGSC 6905 [1.0 credit] (formerly 07.695)
Comprehensive Examination

CGSC 6909 (formerly 07.699)
Ph.D. Thesis

Selection of Courses in Related Disciplines

Students may register in courses in the area of cognition offered by any of the participating departments, including Computer Science, Psychology, Linguistics, and Philosophy. Students may also register in courses offered by the University of Ottawa, subject to the General Regulations. Please note that not all courses are offered every year and some courses have limited enrolment. Students are advised to consult the Institute for scheduling details.

Courses with a four-letter prefix are Carleton University courses; those with a three-letter prefix are University of Ottawa courses.

Computer Science Courses
COMP 5005 (CSI 5390), COMP 5006 (CSI 5306), COMP 5007 (CSI 5307), COMP 5100 (CSI 5180), COMP 5200 (CSI 5182) COMP 5206 (CSI 5183), COMP 5807 (CSI 5104), COMP 6604 (CSI 7162), COMP 6901 (CSI 7901) CSI 5101 (COMP 5601) Formal Models of Computational Systems

CSI 5162 (COMP 5702) Topics in the Theory of Computing Artificial Intelligence

CSI 5181 (COMP 5705) Applications in software Development

CSI 5184 (COMP 5804) Logic Programming

CSI 5304 (COMP 5602) Knowledge Engineering

CSI 5386 (COMP 5505) Natural Language Processing

CSI 5387 (COMP 5706) Concept Learning Systems

CSI 5388 (COMP 5801) Topics in Machine Learning

CSI 5510 (COMP 5707) Formal Principles of Software Development

CSI 5580 (COMP 5100) Subject in Artificial Intelligence

Psychology (Cognitive Psychology)
PSYC 5106, PSYC 5300, PSYC 5301, PSYC 5403, PSYC 5407, PSYC 5700, PSYC 5703, PSYC 5704, PSYC 6206, PSYC 6601, PSYC 6602, PSYC 6603, PSYC 6605, PSYC 6700

(Neuroscience)
PSYC 5200, PSYC 6200, PSYC 6203, PSYC 6204, PSYC 6205, PSYC 6604, PSYC 6606

Linguistics and Applied Language Studies
LALS 5405, LALS 5601, LALS 5604, LALS 5701, LALS 5902, LALS 5907

LIN 5915 Phonology

LIN 5917 Syntax

LIN 5918 Semantics

LIN 6915 Topics in Phonological Theory

LIN 6917 Syntax

LIN 7901 Psycholinguistics

LIN 7951 Topics in Applied Linguistics.

Philosophy
PHIL 5200, PHIL 5104, PHIL 5105, PHIL 5204, PHIL 5205, PHIL 5304, PHIL 5305

Institute for Comparative Studies in Literature, Art and Culture: Comparative Literary Studies

Dunton Tower 1424
Telephone: (613) 520-2177
Fax: (613) 520-2564
E-mail: icslac@carleton.ca

Director of the Institute, Christopher Faulkner

Graduate Supervisor of Comparative Literary Studies, Gurli Woods

The Institute for Comparative Studies in Literature, Art, and Culture offers programs of graduate study leading to the degrees of Master of Arts and Doctor of Philosophy in Comparative Literary Studies.

The purpose of the program in comparative literature is to study literature in its international context, and to relate and compare literary phenomena usually studied in isolation because of linguistic barriers and the traditional departmental division of academic disciplines. Thus, taking into account the interrelation of all humanistic studies, such as the various literatures, philosophy, psychology, sociology, the visual arts, and history, comparatists view literary creation within the total complex evolution of world literature. The historical flow of literary archetypes, the role of folklore and myth in literature, recurrent problems of literary theory, and consideration of the less well known literatures of the world are some of the objects of comparative literary studies.

Qualifying-Year Program

The regulations governing admission to the qualifying-year program are outlined in the General Regulations section of this Calendar.

Applicants will normally have the equivalent of a Combined Honours B.A. with high honours standing.

The total course program must be determined in consultation with the supervisor of graduate studies. Formal admission to the master's program may be considered at the end of the first term.

Master of Arts

Admission Requirements

Please note: Admission to the M.A. program in Comparative Literary Studies has been suspended.

The regulations governing admission to the M.A. program are outlined in the General Regulations section of this Calendar.

The specific requirements for admission to the M.A. program in Comparative Literary Studies are as follows:

- An Honours B.A. degree (or the equivalent) with at least high honours standing in a literature (studied in the original language) or in two literatures or in a literature and a related arts subject

- Proficiency in English

- An ability to work at the graduate level in an additional language approved by Comparative Literary Studies. Students whose record does not clearly demonstrate this ability will be required to take as part of their program at least 0.5 credit in the literature of this second language in the original language

Program Requirements

Master's candidates in Comparative Literary Studies will follow one of two 5.0 credit options:

Thesis Program:
- CLST 5001 (0.5 credit), and CLST 5002 (0.5 credit)

- 1.0 credit at the 5000-level selected from those courses offered by Comparative Literary Studies (max. 0.5 credit Directed Studies included)

- 1.0 credit at the 5000-level selected from any course offered in Comparative Literary Studies or from other programs in the University with the approval of the graduate committee.

- CLST 5909 (2.0 credits)

Non-Thesis Program
- CLST 5001 (0.5 credit), and CLST 5002 (0.5 credit)

- 2.0 credits at the 5000-level selected from those courses offered by Comparative Literary Studies (max. 0.5 credit Directed Studies included)

- 1.0 credit at the 5000-level selected from any courses offered in Comparative Literary Studies or from other programs in the University with the approval of the graduate committee

- CLST 5903 (1.0 credit)

Guidelines for Completion of Master's Degree

The master's program is normally completed no later than two years or six terms after initial full-time registration and six years or eighteen terms after initial part-time registration.

Doctor of Philosophy

Admission Requirements

Please note: Admission to the Ph.D. program in Comparative Literary Studies has been suspended.

The normal requirement for admission to the Ph.D. program is an M.A. degree in literary studies (or in related subjects approved by Comparative Literary Studies) with at least high honours standing, normally with no grade below B-.

Each applicant must supply proof, by means of a research effort that has resulted in an extensive essay, that he or she is capable of producing a publishable paper. Such proof will be submitted at the time of application to the program.

Students admitted into the program with a master's degree earned in another department or institution will be required to make up any deficiencies in course work as required by Comparative Literary Studies.

In exceptional cases, an outstanding student who has completed the B.A. Honours degree and who meets the language requirements outlined below, may be admitted directly to the doctoral program. The program requirement for these students is normally 15.0 credits.

A student who transfers from the master's program in Comparative Literary Studies must meet the language requirements on admission as well as those listed under program requirements.

Applicants must demonstrate a capacity to work at the graduate level in at least two languages other than English. The two languages must be approved by Comparative Literary Studies. Normally, one of the two languages must be French. Applicants must also be proficient in English. Students whose native tongue is not English may be required to pass the TOEFL test with a minimum score of 600.

Program Requirements

- 3.0 credits at the 6000-level to be chosen from courses offered by the discipline. (0.5 credit may be at the 5000-level.)

- 0.5 credit at either the 5000- or 6000-level in the social sciences to be approved by the graduate adviser.

- 0.5 credit at the 6000-level outside the area of specialization of the student to be chosen from the courses offered by the discipline.

- A 1.0 credit comprehensive examination, both oral and written parts to be taken prior to the approval of the Ph.D. thesis prospectus.

- A thesis equivalent to 5.0 credits.

Comprehensive Examinations

The comprehensive examination is designed to test the candidate's competence both in comparative literary theory and in the chosen area of specialization. The comprehensive examination is to be completed after course requirements for the Ph.D. have been completed.

Students admitted to the program who have a master's degree in the area of literary studies (or in related subjects approved by Comparative Literary Studies) must normally satisfy the comprehensive examination requirement by the end of the third term in the program.

Those students either admitted directly into the program from the B.A. Honours program or transferring from the master's to the doctoral program must satisfy the comprehensive examination requirement no later than the end of the third year or ninth term of study.

Normally the comprehensive examination must be completed no later than four years or twelve terms after the initial part-time registration following the M.A. (or equivalent).

Students admitted directly from the B.A. Honours program or transferring from the master's to the doctoral program must earn 15.0 credits beyond the B.A. honours and most of the master's program in Comparative Literary Studies, with the exception of the comprehensive examination which may be replaced by course work equivalent to 1.0 credit.

Thesis

The Institute appoints a thesis supervisor and an advisory committee for each doctoral candidate. A minimum of two faculty members will constitute the thesis advisory committee and one of the two members will be from outside Comparative Literary Studies. Both the thesis supervisor and the advisory committee determine when a thesis proposal may proceed to the graduate committee of Comparative Literary Studies for approval.

Specialization Requirements

Each candidate must demonstrate competence in an area of specialization chosen from the following list: postmodernism, post-colonialism, feminism, gender and literature, the Hebrew Bible, intellectual history, Latin American literature, literary history, literary theory, literature and historical studies, literature and linguistics, literature and religious studies, literature of the Francophonie, literature written in English, language and social sciences, medieval and early renaissance Hispanic literature, modern theatre and dramatic literature, nineteenth- and twentieth-century French literature, nineteenth- and

twentieth-century German literature, nineteenth-and twentieth-century Italian literature.

Candidates who enter the Ph.D. program with a master's degree in a special area or discipline, and who wish to either continue in that area or discipline or choose another specialization in their doctoral program, will be tested in their chosen area in the specialization portion of the comprehensive examination.

Candidates admitted directly from a B.A. Honours program or transferring from the master's to the doctoral program will be required to take the equivalent of 3.0 credits in the area of specialization, and will be tested in this area in the specialization portion of their comprehensive examination.

Language Requirement

Doctoral students must acquire a reading knowledge in a third language, to be approved by Comparative Literary Studies, before beginning the comprehensive examination. Candidates must successfully complete either 0.5 credit at the master's level in the literature(s) of that language (extra-to-the-degree) or a reading proficiency test administered by Comparative Literary Studies.

Academic Standing

All candidates are required to maintain a GPA of B-.

Of the 10.0 credits required beyond the master's level, no more than 1.0 credit may be at the 5000-level.

Guidelines for Completion of Doctoral Degree

Students admitted with a B.A. (Honours) degree and registered full-time must normally complete the comprehensive examination requirement by the end of the third year or ninth term of full-time study. The thesis proposal must normally be presented after three and one-half years or ten terms of study.

Students admitted with a master's degree and registered full-time must normally complete the comprehensive examination requirement by the end of the third term of study. The thesis proposal must normally be presented no later than the fourth term of study.

Students admitted with a B.A. (Honours) degree and registered part-time must normally complete the comprehensive examination requirement by the end of the ninth year or after twenty-seven terms of study after their initial part-time registration. The thesis proposal must normally be presented no later than ten years or thirty terms of study following the initial part-time registration.

Students admitted with a master's degree and registered part-time must normally complete the comprehensive examination requirement by the end of the fourth year or after twelve terms of study after the initial part-time registration. The thesis proposal must normally be presented no later than five years or fifteen terms of study after the initial part-time registration.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003, please consult the Registration Instructions and Class Schedule booklet, published in the summer.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable. To determine the term of offering, consult the Registration Instructions and Class Schedule booklet, or online at: www.carleton.ca/cu/programs/sched_dates/.

A prerequisite for all graduate-level courses is appropriate linguistic ability and approval of Comparative Literary Studies.

A student will not receive credit for both a 0.5 credit course and a 1.0 credit course which bears the same topic title.

CLST 5001 [0.5 credit] (formerly 17.501)
Comparative Literature: History and Theory
Major developments within discipline of comparative literature from 19th to late 20th century; contributions of discipline to literary criticism; issues and problems today.
Prerequisite: Permission of Comparative Literary Studies.

CLST 5002 [0.5 credit] (formerly 17.502)
Problems in the Theory of Literature
Study of key issues arising from theoretical consideration of literary studies in modern or pre-modern criticism. (Also listed as ENGL 5000 and as CLST 6300)
Prerequisite: Permission of Comparative Literary Studies.

CLST 5201 [0.5 credit] (formerly 17.521)
Literary History: Periods, Styles and Movements I
For 2002-2003, the topic is: Texts and Images from Antiquity to the Renaissance. The relationship between texts and images in the Western Tradition: Theoretical perspectives and historical survey. The "sister arts" in ancient rhetoric; memory and imagery. Case studies: from the pagan gods of Antiquity to Renaissance

emblemata. The Canon vs. "Popular Culture."
Prerequisite: Permission of Comparative Literary Studies

CLST 5202 [0.5 credit] (formerly 17.522)
Literary History: Periods, Styles and Movements II
For 2002-2003, the topic is: Texts and Images from Antiquity to the Renaissance. The relationship between texts and images in the Western Tradition. Theoretical perspectives and historical survey. The "sister arts" in ancient rhetoric; memory and imagery. Case studies: from the pagan gods of Antiquity to Renaissance emblemata. The Canon vs. "Popular Culture." (Also listed as CLST 6505)

CLST 5203 [0.5 credit] (formerly 17.523)
Literary History: Themes and Genres
For 2002-2003, the topic is: Discourse Analysis I: Classical and Medieval Rhetoric. Study of persuasion by the Greeks; 20th-century "discourse analysis". Aristotle's division of discourse into deliberative, forensic and epideictic prefigures distinction between oratory and literature, argumentation and poetry, historiography and fiction, mimesis and diegesis. Classical and Medieval examples of theory and practice. (Also listed as CLST 6500)
Prerequisite: Permission of Comparative Literary Studies

CLST 5302 [0.5 credit] (formerly 17.532)
Studies in the Literature of Identity
For 2002-2003, the topic is: Female Identity: Writing by Women in the Twentieth Century. Gender and narrativity, women's space, marginalization, women and madness, and mothers and daughters in writing by women in northern Europe and North America. A cross-cultural perspective with reference to poststructuralist literary theory, including feminist criticism.
Prerequisite: Permission of Comparative Literary Studies.

CLST 5504 [0.5 credit] (formerly 17.554)
Comparative Perspectives on Literature and Globalization I
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 5506 [0.5 credit] (formerly 17.556)
Comparative Perspectives of Literature and Globalization II
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 5508 [0.5 credit] (formerly 17.558)
Comparative Canadian Literature
For 2002-2003, the topic is: Canadian Women's Autobiography. A study of narrative structures and of the markers of gender, as well as of national, ethnic, race and class difference in selected autobiographical works by English-Canadian and Québécois women writers.
A knowledge of French is recommended but not required.
Prerequisite: Permission of Comparative Literary Studies.

CLST 5800 [0.5 credit] (formerly 17.580)
Seminar in Comparative Literary Studies
For 2002-2003, the topic is: Freudian Impulses on Literature and Culture. A critical examination of Sigmund Freud's intellectual heritage, including N. Abraham, B. Bettelheim, J. Kristeva, J. Lacan, J.-B. Pontalis and S. Zizek, focusing on psychoanalytic problems of literary and cultural studies.
Prerequisite: Permission of Comparative Literary Studies.

CLST 5802 [0.5 credit] (formerly 17.582)
Seminar in Comparative Literature
For 2002-2003, the topic is: The Francophonie. This course examines the nature of diversity in the Francophonie. Plays from Quebec, Martinque and Haiti will be analyzed as reflecting the specificity of three countries in which French co-exists with another language (English or Creole) which affects cultural production.
Prerequisite: Permission of Comparative Literary Studies

CLST 5903 [1.0 credit] (formerly 17.593)
Comprehensives

CLST 5907 [0.5 credit] (formerly 17.597)
Directed Special Studies
From time to time, students whose main interests are not covered by courses offered in a given year may pursue independent research, subject to the availability of a qualified adviser and relevant library resources at Carleton. Interested students should apply directly to the supervisor of graduate studies.
Precludes additional credit for CLST 5908.

CLST 5909F (formerly 17.599)
M.A. Thesis

CLST 6001 [0.5 credit] (formerly 17.601)
Doctoral Seminar I: Literature and Other Discourses
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6002 [0.5 credit] (formerly 17.602)
Doctoral Seminar II: Literature and Other Discourses
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6003 [0.5 credit] (formerly 17.603)
Modernism
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6004 [0.5 credit] (formerly 17.604)
Postmodernism
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6100 [0.5 credit] (formerly 17.610)
Narrative and Non-Fiction
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6200 [0.5 credit] (formerly 17.620)
Literary History
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6205 [0.5 credit] (formerly 17.625)
Hermeneutics and Aesthetic Experiences of Literature
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6300 [0.5 credit] (formerly 17.630)
Text Theory
Topic may vary from year to year. (Also listed as CLST 5002 and as ENGL 5000)
Prerequisite: Permission of Comparative Literary Studies.

CLST 6305 [0.5 credit] (formerly 17.635)
Translation Studies: Theory and Practice
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6400 [0.5 credit] (formerly 17.640)
Gender and Literature
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6500 [0.5 credit] (formerly 17.650)
Rhetoric and Literature
Topic may vary from year to year. (Also listed as CLST 5203)
Prerequisite: Permission of Comparative Literary Studies

CLST 6505 [0.5 credit] (formerly 17.655)
Iconicity and Medieval and Early Renaissance Literature
Topic may vary from year to year. (Also listed as CLST 5202)
Prerequisite: Permission of Comparative Literary Studies.

CLST 6600 [0.5 credit] (formerly 17.660)
Sign, Language and Society
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6803 [0.5 credit] (formerly 17.683)
Seminar in Comparative Literary Studies
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6804 [0.5 credit] (formerly 17.684)
Seminar in Comparative Literary Studies
Topic may vary from year to year. Students should consult Comparative Literary Studies regarding the topic offered.

CLST 6903 [1.0 credit] (formerly 17.693)
Comprehensives

CLST 6909 (formerly 17.699)
Ph.D. Thesis

Computer Science

Herzberg Building 5302
Telephone: (613) 520-4333
Fax: (613) 520-4334
E-mail: scs@carleton.ca

Web site: www.scs.carleton.ca

The School

Director of the School, F. Dehne

Supervisor of Graduate Studies, J.-P. Corriveau

The School of Computer Science offers degrees leading to a Master of Computer Science or a Ph.D. in Computer Science through the Ottawa-Carleton Institute for Computer Science. The Institute is jointly administered by the School and the School of Information Technology and Engineering at the University of Ottawa. For further information, including admission and program requirements, see the Institute's section of this Calendar.

A program leading to the M.Sc. in Information and Systems Science is offered in cooperation with the School of Mathematics and Statistics and the Department of Systems and Computer Engineering. For further information see the Information and Systems Science section in this Calendar.

The research expertise of the School's faculty is concentrated in the following areas:

Algorithms and Complexity

Computational geometry and algebra, combinatorial optimization, distributed and parallel algorithms, multi-dimensional data structures, stochastic automata, graph theory, partial orders.

Intelligent Systems

Expert systems, knowledge acquisition tools, knowledge based assistants, connectionism and neural networks, natural language understanding, learning and adaptability, robotics, pattern recognition.

Object-Oriented Systems

Visual programming, filing systems, databases, user interfaces, simulation, animation, software engineering, office automation.

Distributed Systems

Operating systems, databases, systolic architectures, tools for performance studies, distributed programming languages, parallel computing, communication complexity, networks.

In addition to its undergraduate laboratories, the School maintains a number of state-of-the-art research laboratories all integrated via a department and campus area network.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

The complete list of courses available through the Ottawa-Carleton Institute for Computer Science is provided in the Institute's section of this Calendar. The following courses are offered by the School of Computer Science.

COMP 5001 [0.5 credit] (formerly 95.501) (CSI 5113)
Foundations of Programming Languages
This course examines current topics pertaining to the semantics and use of programming languages. Some of the following different styles of languages are considered: functional, object-oriented, logic, visual, constraint and imperative. Concurrency, distribution, reflection, and other advanced topics may also be addressed.
Precludes: COMP 3007 or the equivalent

COMP 5003 [0.5 credit] (formerly 95.503) (CSI 5308)
Principles of Distributed Computing
Formal models; semantics of distributed computations; theoretical issues in design of distributed algorithms; computational complexity; reducibility and equivalence of distributed problems. Related topics: systolic systems and computations, oligarchical systems and control mechanisms.
Prerequisite: COMP 4001 or equivalent.

COMP 5005 [0.5 credit] (formerly 95.505) (CSI 5390)
Learning Systems for Random Environments
A course on computerized adaptive learning for random environments and its applications. Topics include a mathematical review, learning automata which are deterministic/stochastic, with fixed/variable structures, of continuous/

discretized design, with ergodic/absorbing properties and of estimator families.
Prerequisite: MATH 2600 or MATH 3500, or SYSC 5503 or the equivalent.

COMP 5006 [0.5 credit] (formerly 95.506) (CSI 5306)
Natural Language Understanding
Introduction to current research in natural language processing, with emphasis on semantics and pragmatics rather than syntactic issues, and on analyzing text rather than single sentences. Topics include: meaning representation, representation of pragmatic information, speech act theory, flexible parsing, anaphor and reference, contextual meaning.
Prerequisite: COMP 4007 or COMP 4106 or the equivalent.

COMP 5008 [0.5 credit] (formerly 95.508) (CSI 5164)
Computational Geometry
A study of the design and analysis of algorithms to solve geometric problems with an emphasis on applications such as robotics, graphics, and pattern recognition. Topics include: visibility problems, hidden line and surface removal, path planning amidst obstacles, convex hulls, polygon triangulation, point location.
Prerequisite: COMP 3804 or the equivalent.

COMP 5009 [0.5 credit] (formerly 95.509) (CSI 5141)
Associative Data Structures and Advanced Databases
Concepts and advanced topics in the design, implementation and analysis of physical storage schemes with emphasis on their application to specialized database and information retrieval systems. Topics include: associative searching techniques; multidimensional storage structures; algorithms for spatial data modeling; formulation and optimization of database queries.
Prerequisites: COMP 3005 and COMP 3804, or the equivalent.

COMP 5100 [0.5 credit] (formerly 95.510) (CSI 5180)
Topics in Artificial Intelligence
Several areas in knowledge-based systems are covered, including recent approaches to machine learning and data mining, inference methods, knowledge-based and fuzzy systems, heuristic search, and natural language processing.
Prerequisite: COMP 3007 or the equivalent
Precludes: COMP 4106 or the equivalent.

COMP 5101 [0.5 credit] (formerly 95.511) (CSI 5311)
Distributed Databases and Transaction Processing Systems
Principles involved in the design and implementation of distributed databases and distributed transaction processing systems. Topics include: distributed computing concepts, computing networks, distributed and multi-database system architectures and models, atomicity, synchronization and distributed concurrency control algorithms, data replication, recovery techniques, and reliability in distributed databases.
Precludes additional credit for COMP 4101.
Prerequisites: COMP 3005, COMP 4001, and COMP 4003 or equivalent.

COMP 5102 [0.5 credit] (formerly 95.512) (CSI 5312)
Distributed Operating Systems
Design issues of advanced multiprocessor distributed operating systems: multiprocessor system architectures; process and object models; synchronization and message passing primitives; memory architectures and management; distributed file systems; protection and security; distributed concurrency control; deadlock; recovery; remote tasking; dynamic reconfiguration; performance measurement, modeling, and system tuning.
Prerequisite: COMP 3000 or equivalent.

COMP 5103 [0.5 credit] (formerly 95.513) (CSI 5313)
Computer Security and Cryptography
Introduction to information security in computer and communication systems. Classical and public-key cryptosystems are overviewed. Applications to information schemes and digital signatures, key distribution and key agreement, authentication and secret sharing are also discussed. Also offered at the undergraduate level, with different requirements, as COMP 4103, for which additional credit is precluded.
Prerequisite: COMP 3804 or equivalent.

COMP 5104 [0.5 credit] (formerly 95.514) (CSI 5314)
Object-Oriented Software Development
This course addresses current issues in object-oriented software engineering (modeling and programming). Possible topics include object-oriented languages, models and methodologies, CASE tools, design patterns, real-time performance, testing approaches and patterns, generative and meta programming.
Prerequisite: COMP 2004 or equivalent.

COMP 5105 [0.5 credit] (formerly 95.515) (CSI 5132)
Parallel Processing Systems
Introduction to the issues involved in designing and using parallel processing systems. Topics include: taxonomy and applications of parallel systems; SIMD systems; multiprocessor systems; multicomputer systems; computation versus communication issues in parallel processing; scheduling parallel systems; spinning versus blocking; interconnection networks; hot-spot contention.
Prerequisite: Permission of the School.

COMP 5106 [0.5 credit] (formerly 95.516) (CSI 5123)
Languages for Parallel Computing
Survey of major language paradigms for parallel

computing: sequential imperative, parallel imperative, logic, functional (reduction and dataflow), object and message-passing based languages; communicating sequential processes; and massive data-level parallelism. Topics include: detection, determinism, data partitioning, task scheduling, task granularity, synchronization methods, resource management, and debugging.
Prerequisite: COMP 5001

COMP 5107 [0.5 credit] (formerly 95.517) (CSI 5185)
Statistical and Syntactic Pattern Recognition
Topics include a mathematical review, Bayes decision theory, maximum likelihood and Bayesian learning for parametric pattern recognition, non-parametric methods including nearest neighbor and linear discriminants. Syntactic recognition of strings, substrings, subsequences and tree structures. Applications include speech, shape and character recognition.
Prerequisites: Permission of the School.

COMP 5203 [0.5 credit] (formerly 95.523) (CSI 5173)
Data Networks
Mathematical and practical aspects of design and analysis of communication networks. Topics include: basic concepts, layering, delay models, multi-access communication, queuing theory, routing, fault-tolerance, as well as advanced topics on high-speed networks, ATM, mobile wireless networks, and optical networks.
Prerequisite: COMP 4804 or permission of the School.

COMP 5204 [0.5 credit] (formerly 95.524) (CSI 5124)
Computational Aspects of Geographic Information Systems
Computational perspective of geographic information systems (GIS). Data representations and their operations on raster and vector devices: e.g., quadtrees, grid files, digital elevation models, triangular irregular network models. Analysis and design of efficient algorithms for solving GIS problems: visibility queries, point location, facility location.
Prerequisite: COMP 3804 or the equivalent.

COMP 5206 [0.5 credit] (formerly 95.526) (CSI 5183)
Evolutionary Computation and Artificial Life
Study of algorithms based upon biological theories of evolution, applications to machine learning and optimization problems. Possible topics: Genetic Algorithms, Classifier Systems, and Genetic Programming. Recent work in the fields of Artificial Life (swarm intelligence, distributed agents, behavior-based AI) and of connectionism is also studied.
Prerequisites: COMP 3007 or the equivalent.
Precludes: COMP 4107 or the equivalent.

COMP 5400 [0.5 credit] (formerly 95.540) (CSI 5310)
Software Patterns
This course surveys current developments in software patterns, three-part rules expressing relations between software contexts, problems and solutions. Pattern categories discussed include architectural, design, analysis, refactoring, general-purpose, anti-patterns, and idioms. Students are required to apply existing patterns and to develop and defend new ones.
Prerequisites: COMP 3004 or equivalent.

COMP 5401 [0.5 credit] (formerly 95.541) (CSI 5389)
Electronic Commerce Technologies
Basic e-commerce models. Internet infrastructure and tools. TCP/IP, Web servers, search engines. Cryptography. Public key infrastructure. Key management and certificate authorities. Secure Socket Layer and secure electronic transactions. Content presentation: XML. Open trading protocol. Intelligent mobile agents. Auctions and negotiations. Case studies.
Prerequisites: COMP 2005 and COMP 4104

COMP 5402 [0.5 credit] (formerly 95.542) (CSI 5142)
Wireless Networks and Protocols
Focus is on the link and network layer protocols of wireless networks; applications of wireless networks may be discussed. Topics may include: protocol implementation, mobile IP, resource discovery, wireless LANs/PANs, and Spreadspectrum. Precludes additional credit for COMP 5306.
Prerequisite: COMP 3203 or equivalent.

COMP 5403 [0.5 credit] (formerly 95.543) (CSI 5143)
Real-Time System Development
An advanced course in real-time OO system development that deals with modeling systems at different abstraction levels. A systematic and traceable modeling process is introduced. Topics include: modeling notations (including UML-RT), development process, design patterns, and system testing. Expect a substantial design project. Precludes additional credit for COMP 5806.
Prerequisite: COMP 5104 or equivalent.

COMP 5404 [0.5 credit] (formerly 95.544) (CSI 5144)
Computer-Aided Program Verification
Automatic verification techniques for concurrent, reactive, and real-time programs. Possible topics: temporal logics, the basic model-checking algorithm, symbolic model checking, compositional techniques, exploiting abstraction and symmetry, models based on partial orders, model-checking for the mu-calculus, applications to communication protocols, computer security and digital circuits.
Prerequisite: COMP 4004 or equivalent.

COMP 5703 [0.5 credit] (formerly 95.573)
(CSI 5163)
Algorithm Analysis and Design
Topics of current interest in the analysis and design of sequential and parallel algorithms for non-numerical, algebraic and graph computations. Lower bounds on efficiency of algorithms. Complexity classes. Also offered at the undergraduate level, with different requirements, as COMP 4804, for which additional credit is precluded.
Prerequisite: Permission of the School.

COMP 5704 [0.5 credit] (formerly 95.574)
(CSI 5131)
Parallel Algorithms and Their Implementation
Multiprocessor architectures from an application programmer's perspective: programming models, processor arrays and hypercube multiprocessors, algorithmic paradigms, efficient parallel problem solving, limits of parallelism, software scalability and portability. Student projects in selected application areas: image processing, robotics, graphics, animation, etc. Programming experience on parallel processing equipment.
Prerequisite: COMP 4804 or the equivalent.

COMP 5802 [0.5 credit] (formerly 95.582)
Introduction to Information and Systems Science
An introduction to the process of applying computers in problem solving. Emphasis is placed on the design and analysis of efficient computer algorithms for large, complex problems. Applications in a number of areas are presented: data manipulation, databases, computer networks, queuing systems, optimization. (Also listed as MATH 5802, SYSC 5802, ISYS 5802)

MATH /COMP 5807 [0.5 credit] (formerly 70./95.587) (CSI 5104)
Formal Language and Syntax Analysis
Computability, unsolvable and NP-hard problems. Formal languages, classes of languages, automata. Principles of compiler design, syntax analysis, parsing (top-down, bottom-up), ambiguity, operator precedence, automatic construction of efficient parsers, LR, LR (O), LR(k), SLR, LL(k); syntax directed translation.
Prerequisite: COMP 3002, or MATH 4805 or MATH 5605, or the equivalent.

COMP 5900 [0.5 credit] (formerly 95.590)
(CSI 5140)
Selected Topics in Computer Science
Selected topics, not covered by other graduate courses, will be offered. Details will be available at the time of registration from the school.

COMP 5901 [0.5 credit] (formerly 95.591)
(CSI 5901)
Directed Studies (M.C.S.)
A course of independent study under the supervision of a member of the School of Computer Science.

COMP 5902 [0.5 credit] (formerly 95.592)
(CSI 5900)
Graduate Project (M.C.S./M.Sc. [ISS])

COMP 5903 [1.0 credit] (formerly 95.593)
(CSI 6900)
Intensive Graduate Project (M.C.S.)
A one or two session course. For M.C.S. non-thesis option students only. Not to be combined for credit with COMP 5902.

COMP 5904 [0.0 credit] (CSI 5902)
Master's Seminar
To complete this course, the student must attend 5 graduate seminars at Carleton, and 5 at SITE within a year. The student must also make one presentation in the context of this graduate seminar.

COMP 5905 [2.5 credits] (formerly 95.595)
(CSI 7999)
M.C.S. Thesis

MATH /SYSC/ COMP 5908 [1.5 credits]
(formerly 70/94/95.598)
M.Sc. Thesis in Information and Systems Science

COMP 6100 [0.5 credit] (formerly 95.610)
(CSI 7131)
Advanced Parallel and Systolic Algorithms
This course is a continuation of COMP 5704.
Prerequisite: COMP 5704.

COMP 6104 [0.5 credit] (formerly 95.614)
(CSI 7314)
Advanced Topics in Object-Oriented Systems
Advanced object-oriented software engineering, in particular the issues of reuse and testing. Sample topics include: interaction modeling; class and cluster testing; traceability; design patterns and testing; the C++ standard template library. Students will carry out research.
Prerequisite: COMP 5104 or permission of instructor.

COMP 6601 [0.5 credit] (formerly 95.661)
(CSI 7160)
Advanced Topics in the Theory of Computing

COMP 6602 [0.5 credit] (formerly 95.662)
(CSI 7170)
Advanced Topics in Distributed Computing

COMP 6603 [0.5 credit] (formerly 95.663)
(CSI 7161)
Advanced Topics in Programming Systems and Languages

COMP 6604 [0.5 credit] (formerly 95.664)
(CSI 7162)
Advanced Topics in Computer Applications

COMP 6605 [0.5 credit] (formerly 95.665)
(CSI 7163)
Advanced Topics in Computer Systems

COMP 6901 [0.5 credit] (formerly 95.691) (CSI 7901)
Directed Studies (Ph.D.)

COMP 6902 [0.5 credit] (formerly 95.692) (CSI 7900)
Graduate Project (Ph.D.)

COMP 6907 [0.0 credit] (CSI 9998)
Doctoral Comprehensive
A committee must be assembled and approve at least 3 topics for written examination: typically, a major and two minor areas. An oral examination occurs if the written exam is passed. Both elements must take place within the first 4 terms following initial registration in the program.

The comprehensive may be failed, passed conditionally (i.e., with extra course requirements) or passed unconditionally. If failed this course may be retaken at most one time.

COMP 6908 [0.0 credit]
Doctoral Proposal
Within 8 terms following initial registration in the program, a document generally defining the problem addressed, relating it to the literature, and outlining the hypotheses, goals, research methodology, initial results and validation approach must be submitted to an examination committee and successfully defended.

COMP 6909 [7.5 credits] (formerly 95.699) (CSI 9999)
Ph.D. Thesis

Ottawa-Carleton Institute for Computer Science

Université d'Ottawa
University of Ottawa
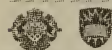
Carleton University

Herzberg Building 5302
Telephone: (613) 520-4333
Fax: (613) 520-4334
E-mail: scs@carleton.ca
Web site: www.scs.carleton.ca

The Institute

Director of the Institute, To be announced

Associate Director of the Institute, To be announced

Students who wish to pursue studies in computer science leading to an M.C.S. or a Ph.D. degree can do so in a joint program offered by the School of Information Technology and Engineering at the University of Ottawa and the School of Computer Science at Carleton University under the auspices of the Ottawa-Carleton Institute for Computer Science. The Institute is responsible for supervising the program and for providing a framework for interaction between the two departments at the research level. In addition to the faculty members from the two computer science departments, the Institute also has members with computer science expertise from other departments.

The M.C.S. is also available as part of ConGESE (Consortium for Graduate Education in Software Engineering), a collaborative program offering a specialization in software engineering. This program is geared towards software professionals working for participating industrial partners. The ConGESE program imposes further regulations and requirements on the existing program. The degree will in each case specify the discipline of the participating unit with Specialization in Software Engineering. Additional information is available from the graduate supervisor and on the Web (by searching for Congese).

Requests for information, and completed applications, should be sent to the director or associate director of the Institute. A joint admissions committee examines all applications and assigns students to the most appropriate campus and supervisor.

Members of the Institute

The "home" department of each member is indicated by (SITE) for the School of Information Technology and Engineering, University of Ottawa; (ADM) for Faculty of Administration, University of Ottawa; (MCG) for the Department of Mechanical Engineering, University of Ottawa; (SCS) for the School of Computer Science, Carleton University; (MAT) for the School of Mathematics and Statistics, Carleton University; (SCE) for the Department of Systems and Computer Engineering, Carleton University; (C) for the Department of Civil and Environmental Engineering, Carleton University; (BUS) for the School of Business, Carleton University.

- M. Barbeau, *Telecommunications software, distributed systems, mobile and wireless networks* (SCS)

- Caroline Barrière, *Natural language processing, lexical knowledge bases, computational lexicography, knowledge acquisition and representation* (SITE)

- L. Bertossi, *Database systems, intelligent information systems, knowledge representation* (SCS)

- Gregor von Bochmann, *Communication protocols, software engineering, formal specifications, verification and validation, distributed applications and systems management, multimedia, high-speed networks, real-time systems* (SITE)

- F. Bordeleau, *Object-oriented system design, real-time and distributed systems, software engineering* (SCS)

- P. K. Bose, *Applied geometric computing, computational geometry, data structures, algorithm design and analysis, randomized algorithms, graph theory* (SCS)

- M. Bouchard, *Signal processing, adaptive filtering, neural networks and control, applied to speech, acoustics and audio* (SITE)

- Sylvia Boyd, *Combinatorial optimization, algorithm design and analysis, graph theory, polyhedral combinatorics* (SITE)

- Lionel Briand, *Software verification and validation, software design for testability and maintainability, software quality assurance and measurement* (SCE)

- J.-P. Corriveau, *Cognitive science, natural language understanding, CASE and knowledge-based tools, object-oriented technology* (SCS)

- Jurek Czyzowicz, (SITE/SCS - Adjunct)

- A. Dabrowski, (SITE)

- S. Dandamudi, *Parallel and distributed systems, database systems, performance evaluation, computer architecture, operating systems* (SCS)

- F. Dehne, *Computational complexity, design and analysis of algorithms, computational geometry, parallel and systolic algorithms* (SCS)

- Jean-François, Delannoy (SITE)

- Sylvain Delisle, (SITE)

- D. Deugo, *Large-scale distributed object computing, evolutionary computation (genetic algorithms, genetic programming, artificial life) and object-oriented systems* (SCS)

- J.D. Dixon, *Algorithms in algebra and number theory, complexity theory, group theory and representation* (MAT)

- Eric Dubois, *Digital signal processing, multidimensional signal processing, data compression, source coding, image/video processing and coding* (SITE)

- A.E.F. Fahim, *Nonlinear optimization, computer aided design and manufacturing (CAD/CAM) methodology and software, flexible manufacturing cell (FMC) control environment, robot control, expert systems for design and manufacturing* (MCG)

- A.P. Felty, *Theorem proving, automated deduction, formal methods in software engineering, computational logic* (SITE)

- P. Flocchini, *Distributed computing, distributed algorithms, sense of direction, compact routing, cellular automata, discrete chaos* (SITE)

- N.D. Georganas, *Multimedia Broadband Communications, Computer-Communications* (SITE)

- V. Groza, (SITE)

- Robert Holte, *Artificial intelligence, machine learning, knowledge compilation, heuristic search* (SITE)

- N. Holtz, *Computer-assisted structural engineering* (CVE)

- D.J. Howe, *Automated reasoning, applied logic, formal methods in software engineering, programming languages* (SCS)

- D.I.-A. Ionescu, *Computers, artificial intelligence, image processing, discrete event and real-time systems* (SITE)

- Nathalie Japkowicz, *Artificial Intelligence, machine learning* (SITE)

- A. Karmouch, *Multimedia communications, multimedia real-time distributed information systems and databases* (SITE)

- G.E. Kersten, *Expert systems, decision support systems* (BUS - Adjunct)

- E. Kranakis, *Cryptography, combinatorial analysis, computational geometry, distributed computing, distributed and data networks* (SCS)

- D. Krizanc, (SCS - Adjunct)

- T. Kunz, *Wireless and mobile computing, load balancing in distributed systems, distributed programming environments for parallel and distributed systems, distributed systems management, parallel and distributed debugging, program understanding* (SCE)

- R. Laganière, *Computer vision, image processing* (SITE)

- W.R. Lalonde, *Symbolic processing languages, fifth generation machines, learning systems, compilers, artificial intelligence* (SCS)

- Mark Lanthier, *Behaviour-based robotics, artificial life, computational geometry, shortest path computations, GIS applications, parallel and distributed computing applications* (SCS)

- Timothy Lethbridge, *Human-Computer interaction/user interfaces, software engineering, tools and work practices, software reverse engineering, knowledge representation* (SITE)

- Mengchi Liu, *Database systems, Web query and inference technologies, object-oriented programming, and logic programming* (SCS)

- L. Logrippo, *Telecommunications software engineering, software specification and verification with emphasis on distributed software* (SITE)

- A. Maheshwari, *Data structures and algorithms, parallel computation, computational geometry, graph algorithms* (SCS)

- S.A. Mahmoud, *Wireless communication systems, protocols for high-speed networks, speech processing and computer network design* (SCE)

- Shikharesh Majumdar, *Parallel and distributed systems, performance evaluation, operating systems* (SCE)

- D. Makrakis, *Computer Networks: Architectures, Protocols, Management, Broadband Applications* (SITE)

- M. Marchand, *Artificial neural networks, machine learning and applications, pattern recognition* (SITE)

- S.J. Matwin, *Artificial intelligence, knowledge-based systems, machine learning, software reuse* (SITE)

- David R. McDonald, *Applied probability, rare events in queueing networks, applications to telecommunications* (SITE)

- Ali Miri, (SITE)

- P. Morin, *Computational geometry, parallel algorithms, network algorithms and cryptography* (SCS)

- L.R. Morris, *Digital signal processing, speech analysis and synthesis, computer graphics* (SCE)

- B.C. Mortimer, *Error-correcting codes, combinatorics, algorithm design and analysis, group theory* (MAT)

- L. Moura, *Combinatorial algorithms, combinatorial designs and their applications, combinatorial optimization* (SITE)

- John Neilson, *Distributed and parallel computing, including: operating systems, performance models, and applications; simulation and prototyping methodology; computer system performance engineering* (SCS - Adjunct)

- Zaguia Nejib, (SITE)

- Doron Nussbaum, *Computational geometry, medical computing, parallel and distributed computing, geographic information systems, robotics and machine vision, data structures and algorithms* (SCS)

- J. Oommen, *Learning systems, stochastic automata, pattern recognition, image processing, adaptive data structures* (SCS)

- F. Oppacher, *Artificial intelligence, genetic algorithms, evolutionary computing, machine learning* (SCS)

- L. Orozco-Barbosa, *Computer architecture, computer networks and performance evaluation* (SITE)

- B. Pagurek, *Communications network management, artificial intelligence and fault management, knowledge-based software debugging* (SCE)

- Daniel Panario, *Computer algebra, analytic combinatorics, analysis of algorithms, cryptography, analytic, computational and combinatorial number theory* (MAT)

- P. Payeur, *3-D modeling for robotics, computer vision, autonomous systems* (SITE)

- D. C. Petriu, *Performance evaluation, software engineering* (SCE)

- E.M. Petriu, *Virtual environments, robotic sensing and perception, neural networks, fuzzy systems* (SITE)

- R.L. Probert, *Quality engineering of communications protocols and communications software, accelerated techniques for software engineering* (SITE)

- J. Pugh, *Object-oriented programming systems, user interfaces, computer graphics* (SCS - Adjunct)

- J. Raymond, *Teleeducation, intranet* (SITE)

- G. Roth, *Computer vision, image processing, evolutionary algorithms, virtual reality and multi-media, computer graphics* (SCS - Adjunct)

- J.-R. Sack, *Algorithms and complexity, computational geometry, graphics, pattern recognition, robotics* (SCS)

- N. Santoro, *Distributed computing, fault tolerance, discrete chaos, reactive environments* (SCS)

- P. Scott, *Logic, theoretical computer science, category theory* (SITE)

- B. Selic, *Software engineering, real-time systems, object-oriented modeling, quality of service* (SCS - Adjunct)

- J.B. Sidney, *Combinatorial optimization, job shop scheduling* (SITE)

- D.R. Skuce, *Applications of artificial intelligence, expert systems, intelligent help and text retrieval, natural language understanding* (SITE)

- M. Smid, *Computational geometry, data structures, geometric networks, randomized algorithms, applications of computational geometry in manufacturing and in the analysis of terrains* (SCS)

- I. Stojmenovic, *Parallel and combinatorial algorithms, evolutionary computing, multiple-valued logic, wireless networks and mobile computing* (SITE)

- S. Szpakowicz, *Computational linguistics, knowledge acquisition, decision support systems* (SITE)

- D.A. Thomas, *Artificial intelligence, fifth generation machines* (SCS - Adjunct)

- Marcel Turcotte, *Artificial Intelligence, bioinformatics* (SITE)

- H. Ural, *Software reliability, verification and testing, communication protocols, distributed computing* (SITE)

- R. Vaillancourt, *Differential equations, numerical and applied mathematics, scientific computation, image compression (JPEG, MPEG), wavelets, chirplets* (SITE)

- G.A. Wainer, (SCE)

- M. Weiss, *Electronic commerce, network communities, agent patterns* (SCS)

- G.M. White, *Information systems, dynamic workflow systems, timetabling and scheduling* (SITE)

- T. White, *Mobile agents, swarm and collective intelligence, evolutionary computing, Internet applications, peer-to-peer computing* (SCS)

- C.M. Woodside, *Performance modeling, performance of distributed software, software design, queueing theory* (SCE)

- D.J. Wright, *Voice over packet networks, business case for broadband networks, electronic commerce, telelearning* (ADM)

- T. Yamakami, *Quantum complexity, theory of relativization, cryptography, average-case complexity, logic, and recursion theory* (SITE)

- Oliver W. Yang, *Computer communications network and protocol design, modeling, performance evaluation, queueing theory internetworking, photonic and IP networks* (SITE)

- Jiying Zhao, (SITE)

Master of Computer Science

Admission Requirements

Applicants should have an Honours bachelor's degree in computer science or the equivalent, with at least high honours standing. By equivalent is meant an Honours degree in a program which includes at least twelve computer science half-credits, two of which must be at the 4000-level, as well as eight half-credits in mathematics, one of which must be at the 3000- or 4000-level. These courses must include the topics indicated below:

Computer Science
Data structures/file management, operating systems, computer architecture, algorithm design and analysis, assembly language and two high-level languages

Mathematics
Calculus, linear algebra, algebraic structures or discrete mathematics, probability and statistics, numerical analysis. Applicants who have a general (3-year) bachelor's degree, or who otherwise lack the required undergraduate preparation, may be admitted to a qualifying-year program. Refer to the General Regulations section of this Calendar for regulations governing the qualifying year.

Program Requirements

The program includes graduate study and research in four broad areas identified as follows:

- Software Engineering

- Theory of Computing

- Computer Applications

- Computer Systems

Within these areas, the program emphasizes problems of current practical significance and has close links to the scientific and industrial communities.

Normally, students in the program will be expected to complete a thesis; however, students who have substantial relevant work experience may be permitted to take the non-thesis option, which must include a graduate

research project course. Each candidate submitting a thesis will be required to undertake an oral defence of the thesis.

Students in the thesis option must take 2.5 credits, fulfil the graduate seminar requirement, and complete a thesis. Students in the non-thesis option must take 4.0 credits, plus a graduate project (a project is equal to 1.0 credit and may be completed in one or two terms), and fulfil the graduate seminar requirement. The course selections must be approved by the student's academic adviser, and must include at least:

- 0.5 credit in software engineering

- 0.5 credit in the theory of computing

- 0.5 credit in either computer applications or computer systems

The graduate seminar requirement includes a seminar presentation and participation in at least ten sessions in the joint graduate student seminar series.

Both course and thesis work may be completed either by full-time or part-time study.

A candidate may be permitted to carry out thesis work off campus provided suitable arrangements are made for supervision and experimental work, and prior approval is given by the Institute.

Guidelines for Completion of Master's Degree

The following completion times are estimates only, based on full-time study, and are intended to provide guidance only.

Students are strongly urged to check with the supervisor of graduate studies to determine the exact requirements of the degree program and other related information. Part-time students should calculate the completion times requirement by doubling the time estimates given below.

Students should complete the course work within the first two terms.

Selection of courses should be done in consultation with the student's faculty advisor. Approval from the Graduate Supervisor of the Institute is only required for courses not listed as valid OCICS courses. At most, two Fourth Year undergraduate courses may be taken with the permission of the Graduate Supervisor. A thesis supervisor and thesis topic must be selected by the end of the second term. The supervisor of graduate studies should be formally notified of this selection. The expected completion time for the M.C.S. degree is four to six terms of full-time study depending on the type of thesis and the area of research.

Doctor of Philosophy

Admission Requirements

A master's degree in Computer Science (or the equivalent) with high second-class standing is normally required for admission into the Ph.D. program. Students who are currently registered in the M.C.S. program may, in exceptional cases, be permitted to transfer into the Ph.D. program if they have completed all course requirements with at least high second-class standing and demonstrate significant promise for advanced research.

Program Requirements

- A minimum of 2.5 credits at the graduate level which must include: 0.5 credit in software engineering; 0.5 credit in the theory of computing; 0.5 credit in either computer applications or computer systems.

- Presentation of at least two seminars in the Ottawa-Carleton Institute for Computer Science seminar series. Minimally, the student must make one presentation for the graduate seminar, as well as one presentation for the departmental seminar.

- A comprehensive examination (COMP 6907) involving breadth and depth components.

- A written thesis proposal (COMP 6908) defended at an oral examination.

- A research thesis (COMP 6909) defended at an oral examination.

Guidelines for Completion of the Doctoral Degree

The following completion times are estimates based on full-time study.

During the first term, the student and his or her faculty adviser should select graduate courses related to their area(s) of research and interests. Approval from the Graduate Supervisor of the Institute is only required for courses not listed as valid OCICS courses. An advisory committee comprised of three to five faculty members must be established before the student registers in the comprehensive examination. The committee is responsible for the comprehensive examination, the thesis proposal, and for guiding the student's research. The advisory committee must include at least one representative from SITE. The advisory committee must be approved by the director or associate director of the Institute. Comprehensive examinations (see COMP 6907) must be taken within the first 4 terms. All course requirements must be completed within the first 6 terms. Within the first 8 terms, the student must submit a written thesis proposal and defend it in an oral

examination (see COMP 6908). The expected completion time for the Ph.D. program is approximately twelve terms depending on the type of thesis and the area of research. Before the completion of the program, the student is expected to present at least two seminars in the Ottawa-Carleton Institute for Computer Science seminar series.

Residence Requirement

Students must fulfil a residence requirement of at least four terms of full-time study.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003, please consult the Registration Instructions and Class Schedule booklet, published in the summer.

To determine the term of offering, consult the Registration Instructions and Class Schedule booklet, or online at: www.carleton.ca/cu/programs/sched_dates/.

The courses in the following list are offered by various departments indicated by the prefix of the course code as follows:

Carleton University
MATH or STAT School of Mathematics and Statistics

SYSC Department of Systems and Computer Engineering

COMP School of Computer Science

ELEC Department of Electronics

EACJ Electrical Engineering (Joint Program, offered at University of Ottawa)

University of Ottawa
CSI School of Information Technology and Engineering

ELG School of Information Technology and Engineering

MAT Department of Mathematics

Software Engineering
SYSC 5301 (ELG 6131)

SYSC 5701 (CSI 5117)

SYSC 5703 (ELG 6173)

SYSC 5708 (ELG 6178)

SYSC 5709 (ELG 6179)

SYSC 5806 (ELG 6186)

COMP 5001 (CSI 5113)

COMP 5104 (CSI 5314)

COMP 5106 (CSI 5123)

COMP 5400 (CSI 5310)

COMP 5403 (CSI 5143)

COMP 6104 (CSI 7314)

COMP 6603 (CSI 7161)

CSI 5107 (COMP 5609) Program Construction and Fault Tolerance

CSI 5109 (COMP 5701) Specification Methods for Distributed Systems

CSI 5111 (COMP 5501) Software Testing: Theory and Practice

CSI 5118 (COMP 5302) Automated Verification and Validation of Software

CSI 5122 (COMP 5301) Software Usability

CSI 5181 (COMP 5705) Artificial Intelligence in Software Engineering

CSI 5184 (COMP 5804) Logic Programming

CSI 5507(COMP 5609) La Construction et la Tolérance aux Fautes des Programmes

CSI 5509 (COMP 5701) Méthodes Algébriques pour la Spécification de Systemes Répartis

CSI 5518(COMP 5708) Conception des compilateurs et traducteurs

CSI 5584 (COMP 5804) Programmation logique

Theory of Computing
MATH 4802   Introduction to Mathematical Logic

MATH/COMP 4803 Topics in Applied Logic

MATH/COMP 4804 Design and Analysis of Algorithms

MATH/COMP 4805 Theory of Automata

MATH/COMP 4806 Numerical Linear Analysis

MATH 5605 (MAT 5165)

MATH 5805 (MAT 5308)

SYSC 5005 (ELG 6105)

SYSC 5006

SYSC 5007

COMP 5003 (CSI 5308)

COMP 5005 (CSI 5390)

COMP 5008 (CSI 5164)

COMP 5107 (CSI 5185)

COMP 5203 (CSI 5173)

COMP 5404 (CSI 5144)

COMP 5703 (CSI 5163)

COMP/MATH 5807 (CSI 5104)

COMP 6601 (CSI 7160)

COMP 6602 (CSI 7170)

CSI 5101 (COMP 5601) Formal Models of Computational Systems

CSI 5107 (COMP 5609) Program Construction and Fault Tolerance

CSI 5108 (COMP 5700) Software Specification and Verification

CSI 5110 (COMP 5707) Principles of Formal Software Development

CSI 5162 (COMP 5702) Order: Its Algorithms and Graphical Data Structures

CSI 5164 (COMP 5008) Computational Geometry

CSI 5165 (COMP 5709) Combinatorial Algorithms

CSI 5166(COMP 5805) Applications of Combinatorial Optimization

CSI 5169 (COMP 5304) Wireless Networks and Mobile Computing

CSI 5174 (COMP 5604) Validation Methods for Distributed Systems

CSI 5367 (COMP 5300) Structure in Complexity Theory

CSI 5507 (COMP 5609) La Construction et la Tolérance aux Fautes de Programmes

CSI 5508 (COMP 5700) Spécification et Vérification de Logiciels

CSI 5510 (COMP 5707) Principes de développement formel de logiciels

CSI 5565 (COMP 5709) Algorithmes Combinatoires

Computer Applications
MATH/COMP 4806 Numerical Linear Algebra

SYSC 4005 Discrete Simulation and Its Applications

COMP 4002 Computer Graphics

COMP 4003 Transaction Processing Systems

MATH 5609 (MAT 5301)

MATH 5801 (MAT 5303/ADM 6385)

MATH 5803 (MAT 5304/ADM 6386)

MATH 5804 (MAT 5307/ADM 6387)

MATH 5806 (MAT 5180)

MATH 5808 (MAT 5305)

MATH 5809 (MAT 5306)
SYSC 5001 (ELG 6101)
SYSC 5003 (ELG 6103)
SYSC 5004 (ELG 6104)
SYSC 5005 (ELG 6105)
SYSC 5305 (ELG 6135)
SYSC 5308 (ELG 6138)
SYSC 5402 (ELG 6142)
SYSC 5601 (ELG 6161)
SYSC 5603 (ELG 6163)
COMP 5006 (CSI 5306)
COMP 5100 (CSI 5180)
COMP 5103 (CSI 5313)
COMP 5204 (CSI 5124)
COMP 5206 (CSI 5183)
COMP 5401 (CSI 5389)
COMP 6604 (CSI 7162)
CSI 5114 (COMP 5504) Automated Office Systems
CSI 5125 (COMP 5107) Simulation
CSI 5126 (COMP 5108) Algorithms in Bioinfor-matics
CSI 5161 (COMP 5606) Topics in System Simulation and Optimization
CSI 5162 (COMP 5702) Order: Its Algorithms and Graphical Data Structures
CSI 5181 (COMP 5705) Artificial Intelligence Applications in Software Engineering
CSI 5304 (COMP 5602) Knowledge Engineering
CSI 5380 (COMP 5405) Systems and Architectures for Electronic Commerce
CSI 5386 (COMP 5505) Natural Language Processing
CSI 5387 (COMP 5706) Data Mining and Concept Learning
CSI 5388 (COMP 5801) Topics in Machine Learning
CSI 5514 (COMP 5504) Bureautique
CSI 5580 (COMP 5100) Sujet en intelligence artificielle
CSI 5581 (COMP 5705) Applications de l'intelligence artificielle dans le dévelop-pement des systèmes

CSI 5787 (COMP 5706) Apprentissage Symbolique Automatique
ELG 5162 (EACJ 5005) Knowledge-Based Systems: Principles and Design
ELG 5163 (EACJ 5100) Machine Vision
ELG 5196 (EACJ 5709) Automata and Neural Net works: Ap-plications in Machine Perception
ELG 5199 (EACJ 5104) Design of Multimedia

Computer Systems
SYSC 4507 Introduction to the Architecture of Computer Systems
SYSC 4700 Introduction to Telecommunications

SYSC 5006 (ELG 6106)
SYSC 5101 (ELG 6111)
SYSC 5109 (ELG 6119)
SYSC 5201 (ELG 6121)
SYSC 5207 (ELG 6127)
SYSC 5308 (ELG 6138)
SYSC 5508 (ELG 6158)
SYSC 5603 (ELG 6163)
SYSC 5701 (CSI 5117)
SYSC 5706 (ELG 6176)
SYSC 5707 (ELG 6177)
SYSC 5801 (ELG 6181)
SYSC 5807 (ELG 6187)
COMP 5003 (CSI 5308)
COMP 5009 (CSI 5141)
COMP 5101 (CSI 5311)
COMP 5102 (CSI 5312)
COMP 5105 (CSI 5132)
COMP 5107 (CSI 5185)
COMP 5203 (CSI 5173)
COMP 5401 (CSI 5389)
COMP 5402 (CSI 5142)
COMP 5403 (CSI 5143)
COMP 5704 (CSI 5131)
COMP 6100 (CSI 7131)
COMP 6602 (CSI 7170)
COMP 6605 (CSI 7163)
ELEC 5807 (ELG 6387)

CSI 5109 (COMP 5701)	Specification Methods for Distributed Systems	
CSI 5114 (COMP 5504)	Automated Office Systems	
CSI 5133 (COMP 5608)	Simulation and Testing of Logic Circuits	
CSI 5169 (COMP 5304)	Wireless Networks and Mobile Computing	
CSI 5170 (COMP 5800)	Distributed Data Processing	
CSI 5171 (COMP 5303)	Network Architectures, Services, Protocols and Standards	
CSI 5174 (COMP 5604)	Validation Methods for Distributed Systems	
CSI 5380 (COMP 5405)	Systems and Architectures for Electronic Commerce	
CSI 5509 (COMP 5701)	Méthodes Algébriques pour la Spécification de Systems Répartis	
CSI 5514 (COMP 5504)	Bureautique	
ELG 5192 (EACJ 5707)	Microprocessor-based Systems	
ELG 5193 (EACJ 5708)	Multi-microprocessor Systems	
ELG 5194 (EACJ 5703)	Design and Testing of Reliable Digital Systems	
ELG 5197 (EACJ 5102)	Introduction to Embedded Systems	
ELG 5198 (EACJ 5103)	Parallel Processing with VLSI	
ELG 5374 (EACJ 5607)	Computer-Communication Networks	
ELG 5378 (EACJ 5509)	Image Processing Techniques and Image Communications	

Theses, Projects and Topics

COMP 5900 (CSI 5140)

COMP 5901 (CSI 5901)

COMP 5902 (CSI 5900)

COMP 5903 (CSI 6900)

COMP 5904 (CSI 5902)

COMP 5905 (CSI 7999)

COMP 6601 (CSI 7160)

COMP 6602 (CSI 7170)

COMP 6603 (CSI 7161)

COMP 6604 (CSI 7162)

COMP 6605 (CSI 7163)

COMP 6901 (CSI 7901)

COMP 6902 (CSI 7900)

COMP 6907 (CSI 9998)

COMP 6908 (CSI   )

COMP 6909 (CSI 9999)

Institute for Comparative Studies in Literature, Art and Culture: Cultural Mediations

Dunton Tower 1424
Telephone: (613) 520-2177
Fax: (613) 520-2564
Email: icslac@carleton.ca

The Institute

Director of the Institute: Christopher Faulkner

Supervisor of Ph.D. Studies: Paul Keen

The Institute for Comparative Studies in Literature, Art and Culture offers a program of study and research leading to the Doctor of Philosophy in Cultural Mediations.

The Department of English Language and Literature, the Department of French, the programs in Art History, Film Studies and Music of the School for Studies in Art and Culture, and the program in Comparative Literary Studies participate in the doctoral program.

Doctor of Philosophy

The program is designed to support work in cultural theory of the twentieth century and the analysis of a variety of cultural practices across and between the participating disciplines. The program addresses those issues in cultural theory of the twentieth century that inform interdisciplinary work today in literature, film, music, art and new media: the nature of the text and textuality; the nature of representation, interpretation, meaning and affect; cultural identity and hybridity; the role of technologies of production and reception; the formation of the subject and modes of subjectivity; the functioning of ideology; the meaning and ethics of cultural value. Specific works of literature, film and other cultural practices, including new media, will be studied in relation to questions of theory.

There are four fields of study in the program:

- Literary Studies
- Visual Culture
- Musical Culture
- New Technologies

Admission Requirements

The normal requirement for admission to the Ph.D. program in either a full-time or part-time capacity is an M.A. (or a recognized equivalent) in a discipline appropriate to the interdisciplinary strengths of the program. A GPA of 10.0 (A-) or better is normally required of course work completed at the Master's level.

Appropriate disciplines might include English or French Literature, Art History, Film Studies, Music, Comparative Literature, Anthropology, Canadian Studies, Communication, Geography, History, Philosophy, Sociology, Gender Studies.

Program Requirements

Students admitted to the Ph.D. program in Cultural Mediations are required to complete a total of 10.0 credits as follows:

- 1.0 compulsory credit, CLMD 6101
- 1.0 credit chosen from CLMD 6102, CLMD 6103, CLMD 6104, CLMD 6105
- 0.5 compulsory credit, CLMD 6900
- 1.0 additional credit
- 2.0 comprehensive credits
- 4.5 dissertation credits

Language Requirements

Upon graduation, each student is expected to be proficient in one language (preferably French) in addition to English. Additionally, students will be expected to deal with all material that is their primary object of research in its original language. The graduate supervisor should be consulted about the fulfillment of language requirements.

Comprehensive Examinations

Students are required to pass two written comprehensive examinations. Each comprehensive has a 1.0 credit value:

1. The first comprehensive will be a general examination of the broad range of cultural theory of the twentieth century;

2. The second comprehensive will be a discipline-specific examination from one of the following four areas of specialization chosen by the student: Literary Studies; Visual Culture; Musical Culture; New Technologies.

Thesis

All students are required to complete a thesis in partial fulfillment of the requirements of the degree offered by the program. The thesis must be defended at an oral examination.

All students will be required to prepare, present and defend a thesis proposal before proceeding to the writing of the thesis. The proposal will be discussed and defended before the members of the thesis advisory committee at an oral defense chaired by the graduate supervisor.

The program appoints a doctoral thesis advisory committee, the chair of which shall be the student's thesis supervisor. The committee will consist of at least three members of the university faculty, at least two of whom will be core (or associate) faculty in the program. The advisory committee shall determine when a thesis may go forward for examination.

Academic Standing

Doctoral students must normally obtain a grade of B- or better in each course counted toward the fulfillment of the requirements of the degree.

Guidelines for Completion of the Doctor of Philosophy

Full-time Ph.D. students are expected to complete their requirements within six calendar years. Students who undertake the program by a combination of full-time and part-time study must complete their degree requirements within an elapsed period of eight calendar years, as set out in the General Regulations section of this Calendar.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

CLMD 6101 [1.0 credit] (formerly 25.611)
Perspectives on Interdisciplinarity in Cultural Theory
This course will address the theory and practice of interdisciplinary studies of culture. Attention will be paid to those issues in cultural theory of the twentieth century that inform interdisciplinary work today in literature, film, music, art and new media.

CLMD 6102 [0.5 credit] (formerly 25.612)
Issues of Cultural Identity and Hybridity
This course will look at specific examples of Western and non-Western cultural practice that raise questions about the personal and social consequences of differential cultural relations.

Emphasis will be less upon the discreteness of the cultural practices in question and more upon their heterogeneity and hybridization.

CLMD 6103 [0.5 credit] (formerly 25.613)
Issues of Cultural Mediation and Representation
This course will examine how works from different cultures or works in the same or different media from the same culture pose questions about the nature of representation, interpretation, meaning and affect. Emphasis will be upon the relation between social intelligibility and textual features.

CLMD 6104 [0.5 credit] (formerly 25.614)
Issues of Subjectivity and Difference
This course will concern itself with understanding the theory of the subject and its relations, with examples from specific cultural practices in literary studies, film, music, art, popular culture and new media.

CLMD 6105 [0.5 credit] (formerly 25.615)
Issues in the Technologies of Culture
This course concerns the role that technology plays in changing models of literacy, visuality and aurality. The technologies of the cultures of print, vision and sound will be discussed through specific examples of cultural practices in various media.

CLMD 6900 [0.5 credit] (formerly 25.690)
Interdisciplinary Research Methods
Students will be introduced to a range of methods of inquiry, procedures and practices across related disciplines, using both traditional and electronic research tools, as preparation for the doctoral dissertation, practices of academic publishing, conference presentations, and private and public sector writing and research protocols.

CLMD 6901 [0.5 credit] (formerly 25.691)
Directed Readings in Cultural Mediations
This tutorial is designed to permit students to pursue research on topics chosen in consultation with members of faculty and the graduate supervisor.

CLMD 6902 [0.5 credit] (formerly 25.692)
Special Topic in Cultural Mediations
This in-class course offers selected topics in interdisciplinary studies of culture not available in the regular course offerings.

CLMD 6903 [0.5 credit] (formerly 25.693)
Special Topic in Cultural Mediations
This in-class course offers selected topics in interdisciplinary studies of culture not available in the regular course offerings.

CLMD 6904 [0.5 credit] (formerly 25.694)
Special Topic in Cultural Mediations
This in-class course offers selected topics in interdisciplinary studies of culture not available in the regular course offerings.

CLMD 6907 [1.0 credit] (formerly 25.697)
Comprehensive I
This comprehensive will be a general examination of the broad range of cultural theory of the twentieth century as it informs interdisciplinary work today and the historical, intellectual and cultural frames of reference that this work invokes.

CLMD 6908 [1.0 credit] (formerly 25.698)
Comprehensive II
This comprehensive will be a discipline specific examination in a specialized area of study chosen by the student in consultation with the graduate supervisor. Students will choose from one of the following comprehensive areas: Literary Studies; Visual Culture; Musical Culture; New Technologies.

CLMD 6909 (formerly 25.699)
Ph.D. Thesis

Master's Level Courses

Students may take the equivalent of 1.0 credit at the Master's level.

Other Programs

Students may take the equivalent of 0.5 credit in a related program. Students should contact the supervisor of graduate studies for approval.

Economics

Loeb Building C877
Telephone: (613) 520-3743
Fax: (613) 520-3906
E-mail: economics@carleton.ca
Web site: www.carleton.ca/economics/

The Department

Chair of the Department, A.R.M. Ritter

Supervisor of M.A. Studies, F.R. Woolley

Supervisor of Ph.D. Studies, Z. Chen

Director of Joint Doctoral Program with the University of Ottawa, Z. Chen

The Department of Economics offers programs of study and research leading to the M.A. and Ph.D. degrees.

Graduate students in economics undertake a thorough review of economic theory, together with an analysis of the Canadian economy, its institutions and history, and the working of public policy. Stress is placed on the understanding and application of quantitative methods to all aspects of economics. Although the programs are generally oriented towards policy problems, there is considerable opportunity for the development of specialized interests.

The main areas of study within the Department include the following:

- Industrial Organization
- Public Economics
- Monetary Economics
- International Economics
- Economic Development
- Economics of the Environment
- Economic Theory
- Quantitative Methods

Qualifying-Year Program

Applicants who have a general (3-year) bachelor's degree, or who otherwise lack the required undergraduate preparation may be admitted to a qualifying-year program designed to raise their standing to honours status. If successful, they may be permitted to proceed to the master's program the following year.

Refer to the General Regulations section of this Calendar for details of the regulations governing the qualifying year.

Master of Arts

Admission Requirements

The normal requirement for admission to the master's program is a B.A. (Honours) (or the equivalent) in Economics, with at least high honours standing.

Applicants are expected to have had adequate preparation in microeconomic and macroeconomic theory, econometrics, and mathematics. This could be satisfied, for example, by the following four undergraduate courses: advanced microeconomic theory, advanced macroeconomic theory, econometrics, and mathematics for economists. Students with deficiencies in these requirements may have their program requirements extended accordingly.

The Department may require certain applicants to write the Graduate Record Examination Aptitude Test and the Advanced Test in Economics offered by the Educational Testing Service.

Program Requirements

All master's students in economics must fulfil the following requirements :

Economics
ECON 5001, ECON 5002, ECON 5005

In addition, each candidate must select and complete one of the following:

- Approved courses for 2.5 credits, 1.0 of which may be selected from among those offered in a related discipline, with approval of the Department, through the supervisor of M.A. Studies, or

- A thesis equivalent to 1.5 credits and approved course(s) for 1.0 credit

All approved course(s) normally will be taken at the 5000 level.

ECON 5903 is not normally allowed for credit towards an M.A. degree except when listed as an additional requirement.

Internship Placement

An Internship option is available to full-time students in the M.A. program who are eligible to work in Canada. Registration in the Internship option requires departmental permission and is also limited by availability of placements. Students may apply to the M.A. Supervisor for the Internship option after completing ECON 5001, ECON 5002 and ECON 5005 or after completing 3.0 credits.

Internship placements will locate students for at least one term in the public service, the private sector, or non-governmental organizations. Students will integrate theoretical and applied economic analysis in their work experience. During their work term, students are required to register in ECON 5902: Internship Placement, which is additional to the existing program requirements. While taking ECON 5902, students are considered to be part-time, and may register for not more than 1.0 credit in total.

Academic Standing

A grade of B- or better must normally be received in each credit counted towards the master's degree. With respect to the required core credits in the program, ECON 5001, ECON 5002 and ECON 5005, there will be no exceptions. A candidate may, with the recommendation of the Department and the approval of the Dean of the Faculty of Graduate Studies and Research, be allowed a grade of C+ in 1.0 credit.

Guidelines for Completion of Master's Degree

Full-time master's students are expected to complete their requirements within two terms. Part-time students will take a minimum of five terms but must complete within an elapsed period of six calendar years, as set out in Section 13 of the General Regulations of this Calendar.

Doctor of Philosophy

The doctoral program is offered jointly by the Departments of Economics at Carleton University and the University of Ottawa.

The Ph.D. program stresses the application of economic theory to the analysis of Canadian economic policy and economic development. Six areas of specialization are available for intensive study and thesis research: public economics, industrial organization, monetary economics, international economics, economic development, and economics of the environment. The program of courses and thesis guidance, drawing upon the faculty of the two Departments, will encompass course requirements, policy-oriented workshops, comprehensive examinations, and a thesis. Students are expected to have, or to acquire, proficiency in mathematics and statistics before proceeding with the program.

In cases of exceptional merit, Ph.D. candidates may be accepted on a part-time basis.

Admission Requirements

The normal requirement for admission into the Ph.D. program is a master's degree (or the equivalent) from a recognized university, with high honours standing. The Department may require certain applicants to write the Graduate Record Examination Aptitude Test and the Advanced Test in Economics offered by the Educational Testing Service.

Transfer from Master's to Ph.D. Program

A student who shows outstanding academic performance, and who demonstrates high promise for advanced research during the master's program may, subject to meeting the requirements below, be permitted to transfer into the Ph.D. program without completing the M.A. program;

- The student will have completed ECON 5001, ECON 5002 and ECON 5005.
- The student must make formal application to the graduate studies committee.
- Students permitted to transfer into the Ph.D. program will be required to complete the equivalent of 13.5 credits of which 6.0 or 7.0 credits will be assigned to the Ph.D. Thesis, depending on the student's background and grades at the time of the transfer.
- Students who have taken ECON 6000 and/ or ECON 6001 as part of the M.A. curriculum will be granted advanced standing in these courses.

Program Requirements

Students admitted to the joint Ph.D. program are required to complete 10.0 credits (unless additional course work is required), including 1.5 compulsory credits in ECON 6000 (ECO 7922), ECON 6001 (ECO 7923) and ECON 5701 (ECO 7126;7526) .

Students are also required to do course work in two of six fields of specialization leading to field comprehensive exams and the writing of a thesis. To fulfil this requirement, students are expected to assimilate the material in 1.5 credits (or the equivalent) in each of two fields of specialization. However, the Department expects that a typical student entering the program with a completed M.A. will have taken the equivalent of 1.5 credits during his or her M.A. course work. If a student entering the program meets this expectation, the student is required to take only 1.5 credits (or the equivalent) over two fields of specialization. If the student's background is not consistent with this expectation, the admissions committee may require, as a condition of entry, that a student take up to 1.5 additional credits. Courses in the fields of specialization will be:

Public Economics
ECON 5401, ECON 5402, ECON 5403, ECON 5404

Industrial Organization
ECON 5301, ECON 5302, ECON 5303

Monetary Economics
ECON 5606, ECON 5607, ECON 5608, ECON 5609

International Economics
ECON 5601, ECON 5602, ECON 5603, ECON 5505

Economic Development
ECON 5500, ECON 5504, ECON 5505

Economics of the Environment
ECON 5305, ECON 5306, ECON 5507

Comprehensive Examinations

Oral examinations are not compulsory, but a candidate may be required by the examining committee to sit an oral examination.

• Theory

Each student will register in ECON 6900 (ECO 7990) and ECON 6901 (ECO 7990), in order to write the comprehensive examinations in microeconomic and macroeconomic theory. These two examinations are to be written within twelve months of beginning full-time study.

• Fields

Students will be required to write comprehensive examinations in two fields.

Thesis and Workshop Requirements

Thesis

Doctoral students will write and defend a Ph.D. thesis. In preparing the thesis, the student is required to give two thesis workshops. In the first, a research proposal for the thesis will be presented, for evaluation by at least three faculty members. In the second, a substantial portion of the research for the thesis will have been completed and will be presented and evaluated as above. The workshops are requirements for graduation, and students will receive 1.0 credit for them.

Workshops

Students are encouraged to attend and participate in the regular departmental workshops relevant to their fields of interest and research. Such workshops are conducted in six areas:

• Industrial Organization

• Public Economics

• International Economics

• Monetary Economics

• Economic Development

• Economics of the Environment

Further details about this joint Ph.D. program may be obtained by writing to the Director of Doctoral Studies, joint Ph.D. program in Economics, either at the Department of Economics, Carleton University, or at the Department of Economics/Département de science économique, University of Ottawa.

Academic Standing

Doctoral students normally must obtain a grade of B- or better in each credit counted towards the degree.

Guidelines for Completion of Ph.D. Degree

Full-time Ph.D. students are expected to complete their requirements within four calendar years. Students who undertake the program by a combination of full-time and part-time study must complete their degree requirements within an elapsed period of eight calendar years, as set out in the General Regulations section of this Calendar.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Enrolment in graduate courses requires the permission of the Department, through the supervisor of graduate studies.

University of Ottawa courses, where applicable, appear in parentheses following the Carleton course information.

ECON 5001 [0.5 credit] (formerly 43.501)
Microeconomic Theory I
An examination of the theories of the behaviour of individual economic agents: consumers and producers and their relation to the theories of price determination.

ECON 5002 [0.5 credit] (formerly 43.502)
Macroeconomic Theory I
Macroeconomic theory and its implications for economic policy are surveyed in this course, comparing alternative approaches for a variety of topics.

ECON 5003 [0.5 credit] (formerly 43.503)
Microeconomic Theory II
A continuation of Microeconomic Theory I.

ECON 5004 [0.5 credit]S (formerly 43.504)
Macroeconomic Theory II
A continuation of Macroeconomic Theory I.

ECON 5005 [0.5 credit] (formerly 43.505)
Econometrics I
Estimation and testing of the general linear model, with emphasis on problems such as auto-correlation, heteroscedasticity, multicollinearity, and problems due to distributed lags and errors in variables. Introduction to simultaneous equations systems, identification, and estimation.

ECON 5007 [0.5 credit] (formerly 43.507)
Directed Readings
Prerequisite: Permission of the Department.

ECON 5008 [0.5 credit] (formerly 43.508)
Special Topics
Prerequisite: Permission of the Department.

ECON 5009 [0.5 credit] (formerly 43.509)
Directed Research
At least one paper will be required from a student enrolled in any one of these courses.
Prerequisite: Permission of the Department.

ECON 5101 [0.5 credit] (formerly 43.511)
Canadian Economy I
An examination of aspects and problems of the Canadian economy. Topics may include the economic development of Canada, regional development, industrial organization, factor market, income distribution, international trade and capital flows, and macroeconomic stability.

ECON 5102 [0.5 credit] (formerly 43.512)
Canadian Economy II
Economic theory applied to the workings of the Canadian economy. Empirical estimation of various aspects of factor market operation, production, distribution, and aggregate economy. Participants are expected to prepare and present papers for discussion.

ECON 5201 [0.5 credit] (formerly 43.521)
History of Economic Thought I
The crucial achievements in economic theory and doctrine in the nineteenth and twentieth centuries are studied. Special emphasis is given to the interrelationship between the social environment and economic thought - especially to the role of economics in the development of the national state and international institutions. Also offered at the undergraduate level, with different requirements, as part of ECON 4105, for which additional credit is precluded.

ECON 5202 [0.5 credit] (formerly 43.522)
History of Economic Thought II
A continuation of ECON 5201. Also offered at the undergraduate level, with different requirements, as part of ECON 4105, for which additional credit is precluded.
Prerequisite: ECON 5201 or permission of the Department.

ECON 5205 [0.5 credit] (formerly 43.525)
(ECO 7125; 7525)
Mathematical Economics
General equilibrium; dynamic optimization; game theory.

ECON 5301 [0.5 credit] (formerly 43.531)
(ECO 6140; 6540)
Firms and Markets
An examination of theories pertaining to industrial organization and their application to particular industries in Canada and elsewhere by way of empirical studies.

ECON 5302 [0.5 credit] (formerly 43.532)
(ECO 6141; 6541)
Competition Policy
An examination of the rationale and application of competition policy with particular attention to the Canadian economy.

ECON 5303 [0.5 credit]S (formerly 43.533)
(ECO 6142; 6542)
Regulation and Public Enterprise
An examination of regulation and public enterprise as alternative approaches for influencing industry conduct and performance.

ECON 5305 [0.5 credit] (formerly 43.535)
(ECO 6143; 6543)
Economics of Natural Resources
Dynamic optimization; theory of renewable and non-renewable natural resources, including the environment; policy options for correcting market failures.

ECON 5306 [0.5 credit] (formerly 43.536)
(ECO 6151; 6551)
Economics of the Environment
The environment as natural capital; environmental valuation techniques; elements of environmental income accounting; sustainable development theories and practice; institutional questions and policy issues.
Prerequisite: ECON 5305.

ECON 5307 [0.5 credit] (formerly 43.537)
Labour Economics
The application of price theory to the labour market. Topics include models of labour supply and labour demand, human capital and the economics of education and unions and their impact on the labour market. Also offered at the undergraduate level, with different requirements, as ECON 4306, for which additional credit is precluded.

ECON 5308 [0.5 credit] (formerly 43.538)
Law and Economics
The interrelationship of law and economics, emphasizing transaction costs and property rights. Economic analysis of such topics as the allocative effects of alternative property rights, contract, tort, and nuisance law and the economics of crime, pollution, pay television, and eminent domain.

ECON 5309 [0.5 credit] (formerly 43.539)
Applied Industrial Economics
The application of industrial economics, with special emphasis on Canada and the rest of North America. Topics include the structure of consumer demand, firm production and

investment, industrial structure and international trade, and the effect of government policies on industrial development.

ECON 5401 [0.5 credit] (formerly 43.541)
(ECO 6130; 6530)
Public Economics: Expenditure
A discussion of the role of government expenditure, both in theory and with reference to the Canadian economy.

ECON 5402 [0.5 credit] (formerly 43.542)
(ECO 6131; 6531)
Public Economics: Taxation
An analysis of the effects of various forms of taxation on economic performance.

ECON 5403 [0.5 credit] (formerly 43.543)
(ECO 6133; 6533)
Public Choice
Democracy, bureaucracy, and economic policy. The public choice of fiscal constitutions, tax shares, and equity rules; voting coalitions and income distribution; the public provision of private goods; public sector size, fiscal illusion, and taxpayer revolts.

ECON 5404 [0.5 credit] (formerly 43.544)
(ECO 6132; 6532)
Fiscal Federalism
This course examines the economic aspects of federalism, including efficiency, redistribution, consideration of a federal system of government, intergovernmental grants, and problems of stabilization policy in a federal context.

ECON 5405 [0.5 credit] (formerly 43.545)
Theoretical Welfare Economics
A rigorous treatment of the theoretical foundations of welfare economics.

ECON 5407 [0.5 credit] (formerly 43.547)
Project Evaluation
An analytical treatment of the principles of project evaluation and their applications. Also offered at the undergraduate level, with different requirements, as ECON 4407, for which additional credit is precluded.

ECON 5500 [0.5 credit] (formerly 43.550)
(ECO 6170; 6570)
Theory of Economic Development
This course will deal with theoretical approaches in the economic development literature in relation to the historical, economic, environmental, social, and political dimensions of the development process.

ECON 5503 [0.5 credit] (formerly 43.553)
Stabilization Policy
An examination of policies aimed at achieving internal and external stability. The implications of economic growth for stabilization policies will be discussed.
Prerequisite: ECON 5002.

ECON 5504 [0.5 credit] (formerly 43.554)
(ECO 6171; 6571)
Economic Development: Internal Aspects
An analysis of major domestic problems of economic development. Topics may include employment, income distribution, choice of technology, sectoral allocation of resources, human resource development, and domestic environmental issues.

ECON 5505 [0.5 credit] (formerly 43.555)
(ECO 6172; 6572)
Economic Development: International Aspects
An analysis of key problems of international economic development such as trade in primary commodities and manufactures, financial flows and debt, the role of multinational corporations, the transfer of technology, and the international dimensions of environmental issues as they relate to the developing countries.

ECON 5507 [0.5 credit] (formerly 43.557)
(ECO 6173; 6573)
Environmental Aspects of Economic Development
Policy aspects of sustainable economic development and environmental quality in developing countries. Topics to include energy use, deforestation, drought and desertification, depletion of natural resources, debt, environment and poverty, sustainable industrial and agricultural development, conservation policies, pollution control and global environmental issues.

ECON 5601 [0.5 credit] (formerly 43.561)
(ECO 6160; 6560)
International Trade: Theory and Policy
International trade theory and its implications for economic policy are examined, with emphasis on topics such as determinants of trade and specialization, gains from trade and commercial policy, international factor mobility, growth, and development.

ECON 5602 [0.5 credit] (formerly 43.562)
(ECO 6161; 6561)
International Monetary Theory and Policy
International monetary theory and policy, with emphasis on topics such as sources of equilibrium and disequilibrium in the balance of payments, balance-of-payments adjustment under fixed versus flexible exchange rates, international capital movements, and recent issues in the international monetary system.

ECON 5603 [0.5 credit] (formerly 43.563)
(ECO 6162; 6562)
Topics in International Economics
An examination of key topics in international economics, including theoretical analysis, quantitative methods and policy formulation, implementation, and evaluation.
Prerequisite: ECON 5601 or ECON 5602.

ECON 5606 [0.5 credit] (formerly 43.566)
(ECO 6180; 6580)
Microeconomic Aspects of Monetary Theory
Microeconomic foundations of monetary theory.
Alternative theories for the existence of money.
Commodity, private and fiat money systems.
The integration of monetary theory with the
theory of value.

ECON 5607 [0.5 credit] (formerly 43.567)
(ECO 6181; 6581)
Macroeconomic Aspects of Monetary Theory
A course in monetary theory dealing with the
macroeconomic interactions of money. Issues
will include such topics as: inflation, money
and wealth; the optimum quantity of money;
the welfare aspects of monetary economies;
the supply of money and its composition;
stabilization policy; money, capital, and growth.

ECON 5608 [0.5 credit] (formerly 43.568)
(ECO 6182; 6582)
Aspects of Financial Intermediation
The evolution of the financial system with special
emphasis on the theory of financial institutions
and its interrelationship with the money supply
process and the central bank. Contemporary
monetary and finance theory applied to
institutional problems in both historical and
contemporary settings.

ECON 5609 [0.5 credit] (formerly 43.569)
(ECO 6183; 6583)
Explorations in Monetary Economics
A course in which explorations in theory, policy
recommendations, and empirical study are
undertaken. The material challenges traditional
approaches by examining such topics as the
endogeneity of money, the role of credit, the
finance motive, the circuit approach, flow of
funds analysis, and austerity policies.

ECON 5701 [0.5 credit] (formerly 43.571)
(ECO 7126; 7526)
Econometrics II
Selected topics from estimating and testing the
regression and simultaneous equation models.
Topics include maximum likelihood estimation,
statistical analysis of residuals, autoregressive
and other time-series models, multivariate
regression model, and elements of asymptotic
statistical theory within the context of the
simultaneous equation model.
Prerequisite: ECON 5005 or equivalent.

ECON 5702 [0.5 credit] (formerly 43.572)
Applied Econometrics
A discussion of the major problems encountered
in applying the tools and techniques of
econometric methods to statistical data for
economic analysis and forecasting. Selected
papers from the applied econometric literature
are critically analyzed and appraised with the
application of modern econometric techniques.
Prerequisite: ECON 5005 or the equivalent.

ECON 5703 [0.5 credit] (formerly 43.573)
Applied Time Series Analysis
Introduces the basic concepts of time series
analysis with emphasis on models used in
economics. Topics include stationary and
nonstationary time series, model identification
and estimation, transfer functions, and forecast
computation. Also offered at the undergraduate
level, with different requirements, as ECON
4803, for which additional credit is precluded.

ECON 5801 [0.5 credit] (formerly 43.581)
Regional Economics
Regional economic disparities in Canada,
theories and public policy relating thereto.
Consideration will be given to the concept of
regions, location of industry and industrial
structure, and to growth determinants.

ECON 5802 [0.5 credit] (formerly 43.582)
Urban Economics
An examination of the economic properties of
urban areas. Attention will be focused on the
macrodynamics of urban development, together
with the microstatics of the equilibrium properties
of the urban land market.

ECON 5806 [0.5 credit] (formerly 43.586)
Comparative Economic Systems I
This course builds a framework for comparing
economic systems, and also considers the
interaction between economic and political
systems. The traditional Soviet-type economy,
industrial policy, and problems of transition
receive particular attention. Also offered at the
undergraduate level, with different
requirements, as ECON 4806, for which
additional credit is precluded.

ECON 5807 [0.5 credit] (formerly 43.587)
Comparative Economic Systems II
A comparison of contemporary economic
systems. Such diverse economies as mainland
China, Japan, Germany, Sweden, Russia,
Taiwan, and Hungary may be explored. Also
offered at the undergraduate level, with different
requirements, as ECON 4807, for which
additional credit is precluded.

ECON 5902 [0.5 credit] (formerly 43.592)
Internship Placement
Internship students are required to register in
this course during their work term.
Prerequisite: Permission of the Department.

ECON 5903 [0.5 credit] (formerly 43.593)
Mathematical Methods for Economists
A rigorous review of mathematical techniques
in economics, such as: matrix algebra, static
optimization, nonlinear programming, and
difference and differential equations. It
introduces the theory of optimal control, dynamic
programming, and real analysis. Applications
of these tools to various parts of economic theory
are presented.

ECON 5909 [1.5 credit] (formerly 43.599)
M.A. Thesis

ECON 6000 [0.5 credit] (formerly 43.600)
(ECO 7922)
Economic Theory: Microeconomics
An examination of critical aspects of
microeconomic theory drawn from recent
analysis of consumer behaviour, costs and
production, transaction costs, uncertainty, and
the organization of economic activity.
Prerequisite: ECON 5001 or equivalent.

ECON 6001 [0.5 credit] (formerly 43.601)
(ECO 7923)
Economic Theory: Macroeconomics
An examination of critical aspects of
macroeconomic theory drawn from recent
analysis of the microeconomic foundations of
macroeconomics, concepts of macroeconomic
equilibrium and the impact of monetary and
fiscal disturbances. Attention is also directed to
a variety of topics related to the conduct of
macroeconomic policy.
Prerequisite: ECON 5002 or equivalent.

ECON 6101 [0.5 credit] (formerly 43.611)
(ECO 7002; 7004)
Thesis Workshop
See Thesis and Workshop Requirements.

ECON 6700 [0.5 credit] (formerly 43.670)
(ECO 7980)
Directed Readings
Prerequisite: Permission of the Department.

ECON 6900 [0.5 credit] (formerly 43.690)
(ECO 7990)
**Comprehensive Examination in Micro-
economic Theory**
See Comprehensive Examinations.

ECON 6901 [0.5 credit] (formerly 43.691)
(ECO 7990)
**Comprehensive Examination in Macro-
economic Theory**
See Comprehensive Examinations

ECON 6909 [5.0 credits] (formerly 43.699)
(ECO 9999)
Ph.D. Thesis

Ottawa-Carleton Institute for Electrical and Computer Engineering

Université d'Ottawa
University of Ottawa
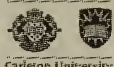
Carleton University

c/o OCIECE Administrator
Room C406A Colonel By Building
University of Ottawa
770 King Edward Avenue
Ottawa, Ontario, Canada K1N 6N5

The Institute

Director of the Institute, Abbas Yongacoglu

The Institute was established in 1983. By combining the programs and resources of the School of Information Technology and Engineering (SITE) at the University of Ottawa and the Departments of Electronics and of Systems and Computer Engineering at Carleton University, OCIECE has become one of the largest electrical and computer engineering graduate studies/research groups in Canada. Programs leading to master's and Ph.D. degrees are available through the Institute in a wide range of fields of electrical and computer engineering.

Members of the Institute

The home department of each member is indicated by (SITE) for the School of Information Technology and Engineering, University of Ottawa; (CE) for the Department of Electronics, Carleton University; (SCE) for the Department of Systems and Computer Engineering, Carleton University.

- A. Aboulnasr, *Digital Signal Processing, Applications in Communications* (SITE)

- S. Abu Hakima, *Multimedia Applications in Telecommunications, Applications for Artificial Intelligence in Telecommunications* (SITE - Adjunct)

- R. Achar, *Computer-Aided Engineering, Simulation and Optimization* (CE)

- N.U. Ahmed, *Systems Theory, Optimal Control, Filtering and Identification with Applications to Spacecraft, Optical Networks and Artificial Hearts* (SITE)

- V. Aitken, *Distributed Processes, Process Control* (SCE)

- S.A. Ajila, *Software Maintenance, Software Process* (SCE)

- S. Aly, *Signal Processing, Digital Transmission* (SCE - Adjunct)

- A. Banihashemi, *Digital and Wireless Communications, Coding and Information Theory* (SCE)

- C. Barrière, *Natural Language Processing, Knowledge Representation, Knowledge Acquisition from Text* (SITE)

- P. Berini, *Electromagnetics, Numerical Modeling, Guided-Wave Optics, Optoelectronics, Optical Communications, Microwaves, Non-linear Microwave Circuits* (SITE)

- G. von Bochmann, *Communication Protocols, Software Engineering, Formal Specifications, Verification and Validation, Distributed Applications and Systems Management, Multimedia, High-Speed Networks, Real-time Systems* (SITE)

- A.R. Boothroyd, *Solid State Devices, ICs, CAD* (CE - Professor Emeritus)

- M. Bouchard, *Signal Processing, Adaptive Filtering, Neural Networks, Speech Processing, Broadband Access Networks* (SITE)

- P. Boulanger, *Computer Vision, Virtual Reality Systems, Image Processing* (SITE)

- L. Briand, *Software Reliability and Certification* (SCE)

- R.J.A. Buhr, *Software Design, Real-Time and Distributed Systems, Object-Oriented Design* (SCE - Adjunct)

- R.J.C. Bultitude, *Digital Radio, Propagation, Mobile and Portable Radio Systems* (SCE - Adjunct)

- C.H. Chan, *VLSI Circuits, Systems* (CE)

- C. Charalambous, *Theory and Applications of Stochastic Processes, Wireless Communication Networks, Information Theory, Data Fusion in Computer Networks, Robust Control, Mathematical Finance, Large Deviations* (SITE)

- S. Charbonneau, *Photonics* (CE Adjunct)

- J.W. Chinneck, *Computer Modeling, Operations Research, Applied Optimization* (SCE)

- J.-Y. Chouinard, *Mobile Communications, Wireless and Mobile Communications, Modulation and Coding, Cryptography* (SITE)

- Jacek Chrostowski, *Photonics, Sensors* (SITE - Adjunct)

- D.C. Coll, *Telecommunications and Computers, Image Processing* (SCE - Professor Emeritus)

- M.A. Copeland, *ICs, Analog Signal Processing, CAD, Digital Radio* (CE - Professor Emeritus)

- G.I. Costache, *Electromagnetic Interference and Compatibility* (SITE)

- A. Cuhadar, *High-performance Computing/ Algorithms* (SCE)

- C. D'Amours, *Digital Communications, Modulation and Coding Techniques* (SITE)

- S.R. Das, *Digital Circuits, Fault-Tolerant Computing* (SITE)

- F. Danilo-Lemoine, *Telecommunications and Statistical Signal Processing* (SCE)

- R.M. Dansereau, *Digital Signal and Image Processing* (SCE)

- M. Devetsikiotis, *Modeling and Simulation, Computer Networks, Applied Optimization* (SCE - Adjunct)

- E. Dubois, *Digital Signal Processing, Multidimensional Signal Processing, Data Compression, Source Coding, Image/Video Processing and Coding* (SITE)

- S. El-Hennawey, *Digital Signal Processing* (SCE - Adjunct)

- M.S. El-Tanany, *Mobile and Portable Communications, Digital Signal Processing, Synchronization* (SCE)

- A. El Saddik, *Multimedia Communications, Collaborative Environments, Human-Machine Interfaces* (SITE)

- B. Esfandiari, *Software Engineering* (SCE)

- D.D. Falconer, *Digital Communications, Signal Processing, Mobile and Portable Digital Communications* (SCE)

- M. Frize, *Biomedical Instrumentation, Clinical Engineering, Infrared Imaging, Decision-Support Systems in Medicine, Ethics in Engineering and Human Experimentation* (SITE and SCE)

- P.A. Galko, *Digital Communications, Optical Communications* (SITE)

- R. Gauthier, *Photonics, Laser Trapping, MEMs* (CE)

- J. Genest, *Optics, Spectrometry, Signal Processing* (SITE)

- N.D. Georganas, *Multimedia Com-munications, Computer Communications* (SITE)

- D.T. Gibbons, *Digital and Biomedical Electronics, Computer Engineering* (SITE)

- R.A. Goubran, *Audio Signal Processing, Digital Systems Design, Adaptive Systems* (SCE)

- V. Groza, *Computer Engineering, Real-Time Embedded Systems, Distributed Applications and Virtual Instrumentation* (SITE)

- R.H.M. Hafez, *Wireless Communications, Neural Networks* (SCE)

- B. Hashem, *Communications* (SCE - Adjunct)

- C. Huang, *High-Speed Multimedia Networks* (SCE)

- J. Huang, *ATM Traffic Management* (SCE - Adjunct)

- R. Impey, *Network Computing* (SCE - Adjunct)

- D. I.-A. Ionescu, *Computers, Artificial Intelligence, Image Processing, Discrete Event and Real-Time Systems* (SITE)

- P. Jay, *Communications Technology* (SITE - Adjunct)

- S. Janz, *Silicon Optoelectronics* (CE - Adjunct)

- F. Johnson, *Orthopedic Biomechanics, Medical Signalling Processing, Biomedical Engineering* (SITE)

- G.M. Karam, *Telecommunications, Software, Analysis and Design of Concurrent Systems and Real Time Systems* (SCE - Adjunct)

- Ahmed Karmouch, *Multimedia Communications, Multimedia Real-Time Distributed Information Systems and Databases* (SITE)

- J.P. Knight, *Logic Design, Computer-Aided IC Design, VLSI Testing* (CE - Adjunct)

- T. Kunz, *Parallel and Distributed Systems* (SCE)

- T.A. Kwasniewski, *Digital and Analog Signal Processing, Microprocessors* (CE)

- Y. Labiche, *Software Engineering, Testing and Object-oriented Techniques* (SCE)

- R. Laganière, *Computer Vision, Image Processing* (SITE)

- I. Lambadaris, *Computer Networks* (SCE)

- B. Lamontagne, *InP Optoelectronics* (CE - Adjunct)

- T. Lethbridge, *Human-Computer Interaction, User Interfaces, Software Engineering Tools and Work Practices, Software Reverse Engineering, Knowledge Representation* (SITE)

- S. Loyka, *Wireless Communications, RF and Microwave Systems, Smart Antennas* (SITE)

- C.H. Lung, *Software Engineering, Network Traffic Engineering* (SCE)

- L. MacEachern, *VLSI, Analog IC Design* (CE)

- S.A. Mahmoud, *Distributed Databases, Radio Packet Switching, Communication Network Protocols* (SCE)

- S. Majumdar, *Parallel and Distributed Systems, Operating Systems, Performance Evaluation* (SCE)

- D. Makrakis, *Computer Networks: Architectures, Protocols, Management, Broadband Applications* (SITE)

- M. Marchand, *Machine Learning, Neural Networks, Pattern Recognition* (SITE)

- I. Marsland, *Mobile and Portable Radio Systems* (SCE)

- R. Mason, *VLSI, Analog IC Design* (CE)

- S. Matwin, *Artificial Intelligence, Knowledge-Based Systems, Machine Learning, Software Reuse* (SITE)

- S.P. McAlister, *Semiconductor Devices, IC Fabrication* (CE - Adjunct)

- C. McDonald, *Applied Probability in Telecommunications* (SITE)

- D. McNamara, *Antennas, Electromagnetics, Numerical Modeling, Microwaves* (SITE)

- A. Miri, *Coding theory, Information Theory, Cryptography* (SITE)

- L.R. Morris, *DSP, Microcomputers, Speech and Image Processing, Computer Architecture* (SCE - Adjunct)

- H.T. Mouftah, *Computer Communications* (SITE - Adjunct)

- T. Mussivand, *Medical Devices, Biomedical Engineering, Biotelemetry, Telemedicine, Artificial Hearts, Virtual Patient Simulation* (SITE)

- M.S. Nakhla, *Computer-Aided Engineering, Simulation and Optimization* (CE)

- B. Nandy, *Communications Software, Distributed Systems* (SCE - Adjunct)

- L. Orozco-Barbosa, *Computer Architecture, Communication Networks and Performance Evaluation* (SITE)

- B. Pagurek, *Network Fault Management, Artifical Intelligence, Diagnosis* (SCE)

- Sethuraman Panchanathan, *Computer Engineering, Video Compression, Image Processing, Parallel Processing* (SITE - Adjunct)

- E. Parsons, *Parallel and Distributed Systems* (SCE - Adjunct)

- P. Payeur, *3-D Modeling for Robotics, Computer Vision, Autonomous Systems* (SITE)

- T. Pearce, *Real-Time Systems, Embedded Systems, Software Engineering* (SCE)

- S. Periyalwar, *Wireless Communications* (SCE - Adjunct)

- A. Petosa, *Antennas* (CE - Adjunct)

- D.C. Petriu, *Performance Evaluation, Software Engineering, Database Systems* (SCE)

- E.M. Petriu, *Robotics, Sensing and Perception, Neural Networks* (SITE)

- Calvin Plett, *Analog I.C. Design* (CE)

- J.-F. Rivest, *Image Processing, Image Coding, Pattern Recognition* (SITE - Adjunct)

- J. Rogers, *RFICs* (CE)

- J.A. Rolia, *Distributed Applications and Interoperable Systems, Performance Management, Software Performance Engineering* (SCE - Adjunct)

- D. Rossille, *Digital Signal Processing Applied to Astronomy and Telecommunication* (SCE - Adjunct)

- Langis Roy, *Microwave Electronics, Integrated Antennas, Electromagnetic Modeling* (CE)

- J. Ryan, *Signal Processing* (SCE - Adjunct)

- H.M. Schwartz, *Robotics, Controls* (SCE)

- J. Shaker, *Antennas, Electromagnetic Modeling* (CE - Adjunct)

- M. Shams, *VLSI Circuits and Systems* (CE)

- B. Sinha, *Electromagnetics* (CE - Adjunct)

- T.J. Smy, *Semiconductor Devices and Transducers, IC Technology* (CE)

- I. Stojmenovic, *Parallel Algorithms, Combinatory Algorithms, Evolutionary Computing* (SITE)

- L. Strawczynski, *Wireless Communications* (SCE - Adjunct)

- M.G. Stubbs, *Microwave Integrate Circuits* (CE - Adjunct)

- B.A. Syrett, *Microwave Integrated Circuits, Optical Interconnects* (CE)

- V. Szwarc, *Signal Processing for Communications* (CE - Adjunct)

- N. Tait, *MEMS, Sensors, IC Fabrication* (CE)

- J. Talim, *Telecommunications Services Design and Analysis* (SCE)

- N.G. Tarr, *Solid State Devices, IC Fabrication* (CE)

- R.E. Thomas, *Solid State Technology, Solar Energy* (CE - Adjunct)

- M. Turcotte, *Bioinformatics, Algorithm Design, Applications of Machine Learning* (SITE)

- G. Wainer, *Discrete Event Simulation, Modeling and Simulation Methodologies, Parallel and Distributed Simulation, Real-Time Systems* (SCE)

- D.J. Walkey, *Simulation and Modeling of Submicron MOS and Bipolar VLSI Devices* (CE)

- C.R. Walker, *Neonatal Medicine* (SCE - Adjunct)

- L. Wang, *Communication and Image Processing* (SITE - Adjunct)

- T. White, *Swarm Intelligence, Genetic Algorithms* (SCE - Adjunct)

- J.S. Wight, *Radar, Spread Spectrum and Navigation Systems, Microwave Circuits, Antennas, Synchronizers, Phase-Locked Circuits* (CE)

- C.M. Woodside, *Software Engineering and Performance, Distributed System Modeling and Design* (SCE)

- Y.Wu, *Communications, Video Compression and Transmission* (SCE - Adjunct)

- D. Xu, *Photonics* (CE - Adjunct)

- M. Yagoub, *Linear and Non-Linear microwave circuits, Applied Electromagnetics* (SITE)

- J. Yan, *Performance and Evaluation of Networks* (SCE - Adjunct)

- O.W. Yang, *Computer Communications, Broadband Networks, Performance Evaluation, Network Interconnection, Queuing Theory* (SITE)

- H. Yanikomeroglu, *Wireless and Mobile Communications, Spread Spectrum Systems* (SCE)

- J. Yao, *Optical Communications, RF photonics, Sensors, Optical signal processing* (SITE)

- T.Yeap, *Neural Networks, Parallel Computer Architectures, VLSI, Digital Systems and Control* (SITE)

- G. Yee, *Parallel and Distributed Systems* (SCE - Adjunct)

- Abbas Yongaçoglu, *Digital Communications Coding and Modulation, Spread Spectrum Systems* (SITE)

- Q.J. Zhang, *CAD for VLSI, Optimization* (CE)

- J. Zhao, *Image and Video Processing, Multimedia Communications* (SITE)

Master's Degree

Admission Requirements

The normal requirement for admission to a master's program is a bachelor's degree with at least high honours standing in electrical engineering or a related discipline.

Program Requirements

The requirements for course work are specified in terms of credits: one credit = one hour/week for one term. Subject to the approval of the departmental chair, a student may take up to half of the course credits in the program in other disciplines (e.g., Mathematics, Computer Science, Physics). Master's programs with a thesis earn the Master of Applied Science degree, while other master's programs earn the Master of Engineering degree.

Master's Degree by Thesis
- Eighteen course credits plus thesis

Master's Degree by Course Work
- Twenty-seven course credits plus a project (nominally six credits)

Cooperative Master's Degree by Thesis
- Eighteen course credits plus a thesis

Cooperative Master's Degree by Course Work
- Twenty-four course credits plus two projects (each conducted in one work term)

Participation in the cooperative master's program is subject to acceptance by a suitable sponsoring organization.

Doctor of Philosophy

Admission Requirements

The normal requirement for admission into the Ph.D. program is a master's degree with thesis in electrical engineering or a related discipline.

Program Requirements

The requirements for course work are specified in terms of credits: one credit = one hour/week for one term. Subject to the approval of the advisory committee, a student may take up to half of the course credits in the program in other disciplines (e.g., Mathematics, Computer Science, Physics).

- A minimum of nine course credits

- A comprehensive examination involving written and oral examinations and a written thesis proposal, to take place before the end of the fourth term of registration

- A thesis which must be defended at an oral examination

Graduate Courses

In all programs, the student may choose graduate courses from either university with the approval of the adviser or advisory committee. Course descriptions may be found in the departmental section of the calendar. All courses are of one term duration. Only a selection of courses listed is given in a particular academic year. The following codes identify the department offering the course.

Carleton University
SYSC Department of Systems and Computer Engineering

ELEC Department of Electronics

University of Ottawa
EACJ Department of Electrical Engineering

The CSI designation refers to the Department of Computer Science at the University of Ottawa. The ELG designation refers to the Department of Electrical Engineering at the University of Ottawa.

Electronics

Mackenzie Building 5170
Telephone: (613) 520-5754
Fax: (613) 520-5708
E-mail: gradinfo@doe.carleton.ca

The Department

Chair of the Department, M.S. Nakhla

Associate Chair, Graduate Studies, L. Roy

In addition to University and Graduate Faculty regulations, all Engineering departments share common procedures that are described in Section 18 of the General Regulations section of this Calendar.

The Department of Electronics offers programs of study and research leading to M.A. Sc., M.Eng. and Ph.D. degrees in Electrical Engineering. These degrees are offered through the Ottawa-Carleton Institute for Electrical and Computer Engineering, which is jointly administered by the Departments of Electronics and of Systems and Computer Engineering at Carleton University, and the Department of Electrical Engineering at the University of Ottawa. For further information, including admission and program requirements, see the Institute's section of this Calendar.

The Department of Electronics is concerned with the fields of applied and physical electronics. Effort is strongest in four broad areas: computer-aided design for electronic circuits; physics and fabrication technology for solid-state electronic and photonic devices; VLSI and high-speed analog integrated circuits; and microwave and photonic subsystems and circuits. Specific areas of specialization include:

Computer-Aided Circuit Design

Development of hierarchical simulators for mixed analog/digital circuits; analysis and design of switched-capacitor networks; analysis and design of high speed circuits; optimization techniques; synthesis of VLSI circuits using both algorithmic and knowledge-based approaches; analysis and simulations of communications systems links; layout synthesis and module generation.

Photonic Devices

Waveguides and holographic optical elements for optical interconnects; electro-optic modulators and switches; waveguides for sensing applications.

Solid State Devices

Fundamental semiconductor device physics; device design and novel device structures; device modeling for CAD; new fabrication processes; submicron and quantum effect devices; photovoltaics; semiconductor sensors and transducers.

Integrated Circuit Engineering

Design and development of linear and digital integrated circuits; fabrication processes and test techniques; MOS, bipolar and BiCMOS ICs; VLSI; computer-aided circuit design.

Analog Signal Processing

Switched-capacitor filters, transversal filters, operational amplifiers and radio frequency functions in analog signal processing applications, particularly for integrated circuit realization.

Circuits

Active filters; linear and nonlinear circuit design; computer-aided circuit design; phase-locked circuits, carriers and clock synchronizers; mixers, modulators and demodulators.

Microwave Electronics

Microwave amplifiers, oscillators, modulators, frequency converters, phase-shifters; use of FET and bipolar transistors, Schottky barrier, varactor, step recovery and PIN diodes; design using finline, microstrip, stripline, coax, and waveguide; monolithic microwave ICs in GaAs; miniature hybrid microwave ICs.

Communications and Radar Electronics

Circuits for terrestrial and satellite communications; circuit implementation of digital modulation techniques; antenna and array design; communication channel character-ization; optical communications circuits; radar transmitter and receiver design.

Biomedical Electronics

Cochlear prosthesis.

CITO

The Department is part of the CITO (Communications and Information Technology of Ontario) Centre of Excellence. Current research areas of the Centre with major participation from the Department are: integrated services digital networks, mobile and portable wireless networks, VLSI in communications, and millimetre wave/optical antennas and circuits for personal communications.

Micronet

The Department is a member, along with seven other Canadian universities and several major industrial organizations, of Micronet, the federally sponsored network on Microelectronic Devices, Circuits and Systems for ULSI (ultra-large scale integration). Within the Department Micronet supports research on: device structures, modeling and fabrication processes for submicron CMOS and BiCMOS ICs; high-speed filters, phase detectors, A-to-D converters, frequency synthesizers and other circuit elements for silicon ICs operating at radio frequencies; analysis and optimization of interconnects for high-speed ICs; and automated generation of custom cells for VLSI design.

Course Offerings

The structure of the courses offered allows a well-integrated master's or Ph.D. program of study to be chosen that is appropriately related to the field of thesis research. Device- and integrated-circuit-oriented courses cover: fabrication, semiconductor device theory, semiconductor device design, integrated circuit design, and integrated circuit reliability. Circuit-oriented courses include: signal-processing electronics, microprocessor electronics, computer-aided circuit design, phase-locked circuits, filter circuits, RF and microwave circuits, antenna and array design. Systems-oriented courses cover: optical fibre communications and radar systems.

IC Fabrication Facilities

Excellent facilities are available for the fabrication of solid state devices and integrated circuits for research purposes. These include a class-100 clean room in which all basic processes required in silicon monolithic technology can be carried out. The clean room houses facilities for photomask generation and photolithography, modern diffusion furnaces, a rapid thermal annealer, low-pressure chemical vapour deposition systems, ECR and reactive ion etchers, e-beam, RF and magnetron sputtering systems for metal deposition, and a SEM. Equipment for thick film deposition, scribing, bonding, and automatic testing is also available. Comprehensive test facilities are available for IC characterization, including wafer probers, HP4145 Semiconductor Parameter Analyzers, and an automated C-V measurement station.

Computing Facilities

The Department has excellent computing facilities for software development and circuit design for integrated circuits and microwave circuits. IC designs using synthesis, standard cells and layout are supported for fabrication through the Canadian Microelectronics Corporation or in-house.

The graduate computer network consists of 90 SUN workstations and has access to the Internet. Industry standard software includes CADENCE, Mentor Graphics, SYNOPSYS, HSpice, ANACAD, VARILOG, SONNET, EESOF, SUPREM, SEDAN, MEDICI, MINIMOS, Franz COMMON Lisp, MATLAB, MATHEMATICA, FRAMEMAKER, and others.

Measurement Facilities

Advanced instrumentation is available supporting automated testing of both analog and digital integrated circuits at frequencies up to 2 GHz. Low noise test facilities include a phase noise measurement system, dynamic signal analyzers, spectrum analyzers, network analyzers, arbitrary waveform generators, digital sampling oscilloscopes, digital data analyzers and generators, and RF frequency synthesizers, all of which may be controlled using the IEEE 488 interface.

The Department has up-to-date facilities for circuit development and measurement at microwave frequencies ranging up to 22 GHz. There are also facilities for work at optical frequencies. Thin-film microwave integrated circuits can be fabricated in-house; there is provision for the fabrication of GaAs MMICs through foundry services. Special purpose microwave equipment includes automated network analyzers, spectrum analyzers and frequency synthesizers, and a complete microwave link analyzer. Data generators and error-detection equipment is available for work on digital communications. Industry standard software, such as SERENADE SUPERCOMPACT, HARMONICA) and ACADEMY (TOUCHSTONE, LIBRA) is available for the computer-aided design and layout of microwave integrated circuits.

The research laboratories maintain extensive collaboration with government and industrial research and development agencies in the Ottawa area.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

The courses offered by the Department of Electronics are as follows:

ELEC 5501 [0.5 credit] (formerly 97.551) (ELG 6351)
Passive Microwave Circuits
Characteristics of homogeneous and inhomogeneous transmission lines and waveguides. Planar transmission lines: stripline, microstrip, coplanar line, slotline. Coupled transmission lines. Modeling of discontinuities. Ferrite components. Microwave network analysis: s-parameters, CAD models. Design of impedance-matching networks, directional couplers, power splitters, filters. Applications in MICs and MMICs.

ELEC 5502 [0.5 credit] (formerly 97.552) (ELG 6352)
Analog Integrated Filters
The fundamentals and details of analog continuous-time and SAW filters. Comparison to switched-capacitor filters. Review of filter concepts, types of filters, approximations, transformations. Building blocks such as op amps, transconductance amplifiers, and gyrators. Design using cascaded second-order sections, multiple loop feedback and LC ladder simulations.

ELEC 5503 [0.5 credit] (formerly 97.553) (ELG 6353)
Radio Frequency Integrated Circuit Design
Integrated radio front-end component design. Overview of radio systems, frequency response, gain, noise, linearity, intermodulation, image rejection, impedance matching, stability, and power dissipation. Detailed design of low-noise amplifiers, mixers, oscillators and power amplifiers. Use of on-chip inductors and baluns. Process variations, parasitics, and packaging.

ELEC 5504 [0.5 credit] (formerly 97.554) (ELG 6354)
Analysis of High-Speed Electronic Packages and Interconnects
Introduction to modeling, simulation and optimization of high-speed VLSI packages; models for packages, interconnects and ground/power planes; lumped, distributed and EM models for interconnects; delay, crosstalk and switching noise; moment matching techniques; concurrent thermal/electrical analysis of IC packages and boards.

ELEC 5505 [0.5 credit] (formerly 97.555) (ELG 6355)
Passive Circuit Theory
General description of networks leading to matrix representations. Elements of matrix algebra as applied to networks. Properties of network functions; poles and zeros of driving point and transfer functions. Foster and Cauer canonic forms. Synthesis of lossless two-ports, single and double-terminated.

ELEC 5506 [0.5 credit] (formerly 97.556) (ELG 6356)
Simulation and Optimization of Electronic Circuits
Introduction to computer simulation and optimization of electrical circuits. Time- and frequency-domain formulations for sensitivity analysis and optimization. Optimization techniques for performance-, cost- and yield-driven design of electronic circuits. Optimization approaches to modeling and parameter extraction of active and passive elements.

ELEC 5507 [0.5 credit] (formerly 97.557) (ELG 6357)
Active Circuit Theory
Characterization of negative resistance one-port networks, signal generation and amplification. Active two-ports; y, z, h, k, chain and scattering parameters. Measurement of two-port parameters. Activity and passivity; reciprocity, non-reciprocity, and anti-reciprocity. Stability, inherent and conditional; power gain of conjugate and mismatched two-port amplifiers. Prerequisite: ELEC 5505 or equivalent.

ELEC 5508 [0.5 credit] (formerly 97.558) (ELG 6358)
Computer Methods for Analysis and Design of VLSI Circuits
Formulation of circuit equations. Sparse matrix techniques. Frequency and time-domain solutions. Relaxation techniques and timing analysis. Noise and distortion analysis. Transmission line effects. Interconnect analysis and crosstalk simulation. Numerical inversion techniques. Asymptotic waveform estimation. Mixed frequency/time domain techniques. Sensitivity analysis.

ELEC 5509 [0.5 credit] (formerly 97.559) (ELG 6359)
Integrated Circuit Technology
Survey of technology used in silicon VLSI integrated circuit fabrication. Crystal growth and crystal defects, oxidation, diffusion, ion implantation and annealing, gettering, CVD, etching, materials for metallization and contacting, and photolithography. Structures and fabrication techniques required for submicron MOSFETs. Applications in advanced CMOS processes.

ELEC 5600 [0.5 credit] (formerly 97.560) (ELG 6360)
Digital Integrated Circuit Testing
Production testing of digital integrated circuits. Outline of methods of testing used in production. Testing schemes and design for testability. Faults and fault models, yield estimates, testability measures, fault simulation, test generation methods, sequential testing, scan design, boundary scan, built-in self test, CMOS testing.

ELEC 5602 [0.5 credit] (formerly 97.562)
(ELG 6362)
Microwave Semiconductor Devices and Applications
Theory of operation for microwave diodes (varactor, p-i-n, Gunn, IMPATT) and transistors (BJT, MESFET, HBT, HEMT). Small-signal, large-signal, and noise models for CAD. Diode oscillators and reflection amplifiers. Design of transistor oscillators and amplifiers. Discussion of technology/fabrication issues and MMIC applications.

ELEC 5603 [0.5 credit] (formerly 97.563)
(ELG 6363)
Electromagnetic Wave Propagation
Review of groundwave, skywave and transionospheric propagation modes relevant to radar, communications and other systems operating in the medium to extra high frequency bands. Electromagnetic noise: physical principles involved, modeling and prediction techniques, and limitations of such techniques in practical situations.

ELEC 5604 [0.5 credit] (formerly 97.564)
(ELG 6364)
Radar Systems
Fundamentals; range equation, minimum detectable signal, radar cross-section, pulse repetition frequency, range ambiguities. Radar classes: CW, FM-CW, MTI, tracking, air surveillance, SSR, PAR, MLS, SAR, SLAR, OTH, 3D and bistatic radars. Radar subsystems; transmitters, antennas, receivers, processors, displays, detection criteria; CFAR receivers, noise, clutter precipitation.

ELEC 5605 [0.5 credit] (formerly 97.565)
(ELG 6365)
Optical Fibre Communications
Transmission characteristics of and design considerations for multi-mode and single-mode optical fibre waveguides; materials, structures, and device properties of laser light sources; properties and performance of p-i-n and avalanche photodiodes; types of optical fibre signal formats, preamplifier topologies, noise, receiver sensitivity, transmitter design, link design.

ELEC 5606 [0.5 credit] (formerly 97.566)
(ELG 6366)
Phase-Locked Loops and Receiver Synchronizers
Phase-locked loops; components, fundamentals, stability, transient response, sinusoidal operation, noise performance, tracking, acquisition and optimization. Receiver synchronizers: carrier synchronizers including squaring loop, Costas loop, and remodulator for BPSK, QPSK BER performance; clock synchronizers including early-late gate, in-phase/midphase, and delay line multiplier.

ELEC 5607 [0.5 credit] (formerly 97.567)
(ELG 6367)
Antennas and Arrays
Design projects are interspersed with live and video lectures. Lectures cover definitions, wire structures, mutual coupling, method-of-moments, array theory, photonic devices, frequency independent structures, reflectors, horns, feeds, slotted waveguide and microstrip arrays. Design projects include a printed dipole, yagi and series-fed microstrip patch array.

ELEC 5608 [0.5 credit] (formerly 97.568)
(ELG 6368)
Fourier Optics
The theory and applications of diffractive and non-diffractive coherent optics, with emphasis on holograms, tomography and high-speed optical computing. Mathematical basis: generalized 2-D Fourier transforms, transfer function of an optical system, 2-D sampling theory, Helmholtz equation, Green's theorem, and the classical diffraction theories.

ELEC 5609 [0.5 credit] (formerly 97.569)
(ELG 6369)
Nonlinear Microwave Devices and Effects
The physical basis and mathematical modeling of a variety of microwave/millimeter-wave devices, (some of which exhibit the most extreme nonlinear behaviour known), how they can be exploited in practical circuits and systems, and how the resulting device/circuit interactions can be analyzed.

ELEC 5702 [0.5 credit] (formerly 97.572)
(ELG 6372)
Optical Electronics
Electromagnetic wave propagation in crystals; review of geometric optics; Gaussian beam propagation; optical fibres; dielectric waveguides for optical integrated circuits; optical resonators; optical properties of materials; theory of laser oscillation; specific laser systems; electro-optic modulators; photorefractive materials and applications; holography; optical interconnects.

ELEC 5703 [0.5 credit] (formerly 97.573)
(ELG 6373)
Advanced Topics in Solid State Devices and IC Technology
Recent and advanced topics in semiconductor device physics, modeling, and integrated circuit fabrication technology. Topic varies from year to year according to departmental research interests. Students may be expected to contribute lectures or seminars on selected topics.

ELEC 5704 [0.5 credit] (formerly 97.574)
(ELG 6374)
Advanced Topics in CAD
Recent and advanced topics in computer-aided techniques for the design of VLSI and telecommunications circuits. Topics will vary from year to year according to the departmental research interests. Students may be expected to contribute lectures or seminars on selected topics.

ELEC 5705 [0.5 credit] (formerly 97.575)
(ELG 6375)
Advanced Topics in VLSI
Recent and advanced topics in the design of very large scale integrated circuits, with emphasis on mixed analog/digital circuits for telecommunications applications. Topic varies from year to year according to departmental research interests. Students may be expected to contribute lectures or seminars on selected topics.

ELEC 5706 [0.5 credit] (formerly 97.576)
(ELG 6376)
Submicron CMOS and BiCMOS Circuits for Sampled Data Applications
The analog aspects of digital CMOS and BiCMOS circuit design in submicron technologies including reliability; sampled analog circuits, including amplifier non-ideal characteristics and switch charge injection; CMOS/BiCMOS amplifier design considerations, leading up to standard folded-cascode and two-stage circuits.

ELEC 5707 [0.5 credit] (formerly 97.577)
(ELG 6377)
Microelectronic Sensors
Fabrication and physical principles of operation of microelectronic sensors. A large variety of sensors will be studied and the basic fabrication methods used in their production reviewed. The devices discussed will include optical sensors, fibre optic sensors, magnetic sensors, temperature sensors and, briefly, chemical sensors.

ELEC 5708 [0.5 credit] (formerly 97.578)
(ELG 6378)
ASICs in Telecommunications
Modern ASIC technologies for Telecom will be introduced. Circuit level building blocks for typical wireline and wireless applications will be overviewed. Both analog and digital circuits will be considered. A topical literature study, circuit level design exercises and take home final exam will be required.

ELEC 5709 [0.5 credit] (formerly 97.579)
(ELG 6379)
Advanced Topics in Electromagnetics
Recent and advanced topics in electro-magnetics, antennas, radar systems, microwave devices and circuits, or optoelectronics. The subject material will vary from year to year according to research interests in the department and/or expertise provided by visiting scholars or sessional lecturers.

ELEC 5800 [0.5 credit] (formerly 97.580)
(ELG 6380)
Theory of Semiconductor Devices
Equilibrium and non-equilibrium conditions in a semiconductor. Carrier transport theory. Physical theory of basic semiconductor device structures and aspects of design: PN junctions and bipolar transistors, field effect devices. Current transport relationships for transistors. Charge control theory. Modeling of device mechanisms. Performance limitations of transistors.

ELEC 5802 [0.5 credit] (formerly 97.582)
(ELG 6382)
Surface-Controlled Semiconductor Devices
Fundamentals of the MOS system; MOS capacitors. Long channel behaviour: theory, limitations and performance of the SPICE level 1 and 2 models. Small geometry effects. Subthreshold operation and modeling. Hot electron effects and reliability.

ELEC 5803 [0.5 credit] (formerly 97.583)
(ELG 6383)
Behavioural Synthesis of ICs
Various topics related to computer analysis and synthesis of VLSI circuits including: logic synthesis, finite state machine synthesis, design methodologies, design for reuse, testing, common VLSI functions, a review of Verilog. Prerequisite: Some IC design knowledge such as given in ELEC 4708.

ELEC 5804 [0.5 credit] (formerly 97.584)
(ELG 6384)
VLSI Design
An IC design course with a strong emphasis on design methodology, to be followed by 97.585 in the second term. The design philosophies considered will include Full Custom design, standard cells, gate-arrays and sea-of-gates using CMOS and BiCMOS technology. State-of-the-art computer-aided design tools are used.

ELEC 5805 [0.5 credit] (formerly 97.585)
(ELG 6385)
VLSI Design Project
Using state-of-the-art CMOS and BiCMOS technologies, students will initiate their own design of an integrated circuit using tools in the CAD lab and submit it for fabrication where the design warrants.

ELEC 5808 [0.5 credit] (formerly 97.588)
(ELG 6388)
Signal Processing Electronics
CCDs, transveral filters, recursive filters, switched capacitor filters, with particular emphasis on integration of analog signal processing techniques in monolithic MOS ICs. Detailed op amp design in CMOS technology. Implications of nonideal op amp behaviour in filter performance. Basic sampled data concepts.

ELEC 5900 [0.5 credit] (formerly 97.590)
Engineering Project I
A one-term course, carrying 0.5 credit, for students pursuing the course work M.Eng. program. An engineering study, analysis and/or design project under the supervision of a faculty member. Written and oral reports are required. This course may be repeated for credit.

ELEC 5901 [1.0 credit] (formerly 97.591)
Engineering Project II
A one-term course, carrying full-course credit, for students pursuing the course work or co-op M.Eng. program. An engineering study, analysis

and/or design project under the supervision of a faculty member. Written and oral reports are required. This course may be repeated for credit.

ELEC 5906 [0.5 credit] (formerly 97.596)
Directed Studies
Various possibilities exist for pursuing directed studies on topics approved by a course supervisor, including the above listed course topics where they are not offered on a formal basis.

ELEC 5909 [2.0 credits] (formerly 97.599)
M.Eng. Thesis

ELEC 6909 [8.5 credits] (formerly 97.699)
Ph.D. Thesis

School of Information Technology and Engineering (SITE) (Electrical and Computer Engineering Program)

University of Ottawa
161 Louis Pasteur
Colonel By Hall
Telephone: (613) 562-5800, ext. 6212
Fax: (613) 562-5175
E-mail: gradinfo@trix.genie.uottawa.ca

The School

Director, E. Petriu

Graduate Program Coordinator,
A. Yongacoglu

SITE is one constituent of the Ottawa-Carleton Institute for Electrical and Computer Engineering and also of the Ottawa-Carleton Institute of Computer Science. Consult the Institute's entry in this calendar for a faculty list, graduate program descriptions and admissions requirements.

School Facilities

Computing Facilities

Students registered in the Electrical and Computer Engineering program have access to leading edge computing equipment, offering both the popular PC windows environment and Unix systems. The general-access graduate computing facilities consist of 25 PCs and a network of Sun workstations and servers distributed in a number of labs. The operating systems available to students include Windows, Linux and the Sun Solarix UNIX environment. Depending on his/her supervisor, a student may also get access to one of the many research groups' private computing laboratory.

Communications and Signal Processing (CASP) Research Laboratory

This laboratory is equipped with a variety of communication system and signal analysis equipment as well as computing facilities. This includes some of the latest equipment for data source simulation, data error rate monitoring, spectrum analysis, cross and autocorrelation function measurement, probability density function measurement, noise simulation, filtering, etc. It also includes prototype digital modulation and demodulation equipment, and various digital signal processing hardware and software systems. Two DSP-based (TMS-Smaster C67x) prototype development platforms are controlled by workstations with Pentium 3 processors. The laboratory also features a 14/12 GHz satellite earth station and associated terminal equipment for testing prototype equipment on an actual satellite link. The computing facilities include several high speed PCs and Sun workstations.

Lightwave Communications Research Laboratory

This laboratory is equipped with many modern optical communications instruments covering wavelengths in the range of 600nm to 1500nm. The laboratory also has several UNIX workstations, and Macintosh and PC computers interconnected on the department's networks. The computing facilities are equipped with software packages used for computer simulation of various aspects of optical communication systems and networks. The laboratory is also equipped with audio-video equipment for image communication over fibre networks and two bench-top fibre local area networks that use WDM and/or CDM on the physical layer.

Multimedia Communications Research Laboratory

This laboratory has developed many applications in telemedicine, distance learning and Web-based telecollaboration and licensed some to industry. It is now focusing on Distributed and Collaborative Virtual Environments, with applications to e-commence and industrial training, on Wireless Multimedia for portable digital devices and on Intelligent Sensors for Pervasive Computing applications. MCRLab is part of the National Capital Institute of Telecommunications (NCIT), and also funded by three centres of excellence (CITO, CITR, TeleLearning), several government sources and industry.

The laboratory is equipped with: a variety of over twenty PCs running Windows NT (some with Linux as a second boot option); two IBM RS-6000, running AIX, with FORE OC-3 ATM cards, ethernet cards and one equipped with IBM Ultimedia MJPEG card; one Sun ULTRA 170 workstation, running Solaris 2.51 and equipped with an ATM OC-3 card; two Sun SPARC 20 workstations, running Solaris 2.5 and equipped with Parallax and ATM OC-3 cards; One SGI O2, running IRIX; One SGI Indy, running IRIX;

Visualization equipment includes a major Silicon Graphics ONYX2 supercomputer and Virtual Reality Facility, as also small and large TV monitors, video cameras, Electro home projector with large projection screen for 3D visualization, and one EPSON video projector.

Networking is provided by IP over Fast Ethernet and ATM.

The Ethernet connectivity is provided through a 3Com Fast-Ethernet Switch and three Netgear Fast Ethernet hubs.

Multimedia conferencing software and various MPEG decoders are also available.

Electromagnetic Research Laboratory

This laboratory is equipped with modern co-axial line and waveguide instruments covering frequencies from 10 MHz to 60 GHz. A computer-controlled frequency domain network analyzer with error correcting capabilities allows reflection and transmission measurements from 5 Hz to 60 GHz. The laboratory is also equipped with a computer-controlled time domain network analyzer and a modern scalar network analyzer (transmission, reflection test set) as well as various frequency counters and spectrum analyzers. A computer controlled three-dimensional scanning system is located in an anechoic chamber and may be used for near-field antenna measurement in both frequency and time domains over the frequency range from 100 MHz to 3GHz. TEM cells at 100 MHz and 3 GHz are available for field probe calibration and EMC/I testing of electronic equipment.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003, please consult the Registration Instructions and Class Schedule booklet, published in the summer.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code. The old Carleton course number (in parentheses) is included for reference, where applicable. To determine the term of offering, consult the Registration Instructions and Class Schedule booklet, or online at: www.carleton.ca/cu/programs/sched_dates/.

EACJ 5005 [0.5 credit] (formerly 92.505) (ELG 5162)
Knowledge-Based Systems: Principles and Design
Introduction to Lisp and Objective C. Knowledge representation using rules, semantic nets, frames. State space representation. Procedural and declarative knowledge. Demons. Production systems. Solution searching algorithms. Expert system components. Inferecne engine principle and representation. Knowledge-based system design. Case study: expert system for process control.

EACJ 5006 [0.5 credit] (formerly 92.506) (ELG 7132)
Topics in Electronics I
Current topics in the field.

EACJ 5007 [0.5 credit] (formerly 92.507) (ELG 7133)
Topics in Electronics II
Current topics in the field.

EACJ 5008 [0.5 credit] (formerly 92.508) (ELG 7575)
Sujets choisis en électronique
Sujets d'intérêt courant dans la matière.

EACJ 5100 [0.5 credit] (formerly 92.510) (ELG 5163)
Machine Vision
Image acquisition. Structured light and stereo ranging. Grey-scale and binary images: geometric and topological properties. Image segmentation, preprocessing, edge finding, processing. Image recognition. Mathematical models. Morphology. Representation of 3-D objects, scene understanding, motion detection. Massively parallel computers architectures. Machine vision for manufacturing. Prerequisite: ELG 4153 or the equivalent.

EACJ 5101 [0.5 credit] (formerly 92.511) (ELG 7199)
Directed Studies
Various possibilities exist for pursuing directed studies on topics approved by the Department and which a full-time faculty member has agreed to direct, including any of the courses listed in the Graduate Calendar that are not being offered on a formal basis in the current academic year.

EACJ 5102 [0.5 credit] (formerly 92.512) (ELG 5197)
Introduction to Embedded Systems
Embedded systems' general characteristics, niche, and design alternatives. Simple embedded systems: sequential event response systems, cyclic executives. Prototype based designs, multitasking and multactivity paradigms. Multitasking system design: elements of real-time operating systems and harmony. Multiactivity system design: PAL and PAL-based design tools.
Prerequisite: ELG 4161 or the equivalent.

EACJ 5103 [0.5 credit] (formerly 92.513) (ELG 5198)
Parallel Processing with VLSI
Parallel processing architectures: array, vector, associative, and orthogonal processors. Switch lattice architecture, hypercubes, systolic arrays, wavefront arrays, pyramid structures, data flow architectures. Memory organization, buses, I/O and interconnection networks. Connection machine processing hardware, RISC and VLSI processors. GaAs technology. Examples of parallel processing architectures.

EACJ 5104 [0.5 credit] (formerly 92.514)
(ELG 5199)
Design of Multimedia Distributed Database Systems
Database concepts and architectures. Data modeling, Relational technology and distributed databases. Examples of the new generation of databases for advanced multimedia applications such as multimedia information retrieval, VOS and the limitations of the conventional models for managing multimedia information (graphics, text, image, audio and video).

EACJ 5105 [0.5 credit] (formerly 92.515)
(ELG 5373)
Secure Communications and Data Encryption
Secure communications: encryption and decryption. Entropy, equivocation and unicity distance. Cryptanalysis and computational complexity. Substitution, transposition and product ciphers. Data Encryption Standard (DES): block and stream cipher modes. Modular arithmetics, Public key cryptosystems: RSA, knapsack. Factorization methods. Elliptic curve cryptopgraphy. Authentication methods and cryptographic protocols.
Prerequisite: ELG 5119 or SYSC 5503 or the equivalent.

EACJ 5106 [0.5 credit] (formerly 92.516)
(ELG 5113)
Stochastic Systems
Wiener processes. Poisson random measures. Stochastic Wiener-Ito integrals. Stochastic integrals relative to Poisson measures. Stochastic differentials. Diffusion processes. Ito-stochastic differential equations: existence, uniqueness of solutions, continuous dependence of solutions to parameters. Semigroup theory. Generation of semigroups applied to stochastic differential equations. Applications to engineering systems modeling.
Prerequisite: Permission of the instructor.

EACJ 5107 [0.5 credit] (formerly 92.517)
(ELG 5121)
Multimedia Communications
Introduction, applications, standards. Networking technologies, Image, video and audio compression. Quality of service and resource management. Scheduling issues for real-time MM transport. Multimedia synchronization. Multimedia and the Internet. Multimedia conferencing. Multimedia to the home. Satellites and multimedia. Multimedia applications.

EACJ 5108 [0.5 credit] (formerly 92.518)
(ELG 5382)
Switching and Traffic Theory for Integrated Broadband Networks
Principles of switching theory. Asynchronous Transfer Mode switching architectures. Principle of teletraffic engineering. Queueing theory and performance evaluation techniques as applied to the study of computer network architectures.

Current topics in computer network modeling analysis and traffic control for high-speed multimedia networks.
Prerequisite: ELG 5374 (EACJ 5607) or ELG 6121 (SYSC 5201) or the equivalent.
Corequisite: ELG 5119 (EACJ 5109) or ELG 6153 (SYSC 5503) or ELG 6103 (SYSC 5003) or the equivalent.

EACJ 5109 [0.5 credit] (formerly 92.519)
(ELG 5119)
Stochastic Processes
Probability. Random variables. Distribution and density functions. Expectation. Functions of random variables. Moments and characteristic functions. Random vectors. Sequences of random variables and convergence. Limit theorems. Stochastic processes: basic notions. Stationarity. Ergodicity. Poisson and Gaussian processes. Second order processes. Representation theorems. Markov processes and chains.
Precludes additional credit for SYSC 5503 (ELG 6153).

EACJ 5200 [0.5 credit] (formerly 92.520)
(ELG 5120)
Queuing Systems
Resource sharing issues: delay, through-put and queue length. Basic queuing theory: Markov chains, birth and death processes. M/M/m/k/n queues, bulk arrival/service systems. Little's Rule. Intermediate queuing theory: M/G/1, G/M/m queues. Advanced queuing theory: G/Gm queue, priority queue, network of queues, etc. Queueing applications.
Precludes additional credit for SYSC 5107 (ELG 6117).
Prerequisite: One of ELG 5119, SYSC 5003 or SYSC 5503 or the equivalent.

EACJ 5201 [0.5 credit] (formerly 92.521)
(ELG 5121)
Multimedia Communications
Introduction, applications, standards. Networking technologies, Image, video and audio compression. Quality of service and resource management. Scheduling issues for real-time MM transport. Multimedia synchronization. Multimedia and the Internet. Multimedia conferencing. Multimedia to the home. Satellites and multimedia. Multimedia applications.

EACJ 5202 [0.5 credit] (formerly 92.522)
(ELG 5122)
Modeling, Analysis and Performance Evaluation in Computer Communications
Network performance issues and their mathematical analysis techniques. Intermittently available server model, probing and tree search techniques, delay cycle, switch/network topology and reliability. Analysis of controlled and random access methods, routing allocation/control, topological design. Selected topics from current literature on various network applications Precludes additional credit for ELG 7186 (EACJ 5606).

Prerequisites: ELG 5120 (EACJ 5200), ELG 5374 (EACJ 5607) or SYSC 5201 (ELG 6121); or the equivalents.

EACJ 5203 [0.5 credit] (formerly 92.523)
(ELG 5191)
Design of Distributed System Software
Distributed systems design and programming issues; distributed computing. Basics of object oriented technology for distributed computing. Distributed objects technologies; CORBA and JAVA. Object oriented models for distributed programming. Distributed client server architecture design. Scalability, interoperability, portability and CORBA services. CASE tools for designing distributed applications.
Precludes additional credit for ELG 7186 (EACJ 5807) (if taken in 1997-98).
Prerequisites: an undergraduate degree in Computer Engineering, or Computer Science, or practical experience in system software design.

EACJ 5207 [0.5 credit] (formerly 92.527)
(ELG 5161)
Robotics: Control, Sensing and Intelligence
Robotics as the intelligent connection of perception to action. Advanced robotics technologies. Robot arm kinematics and dynamics. Planning of manipulator trajectories. Control of robot manipulators. Robot-level programming. Sensors and sensory perception. Control problems for sensory controlled robotic-based flexible manufacturing systems. Task-level programming. Knowledge-based control for mobile robots.
Prerequisite: ELG 4161 or the equivalent.

EACJ 5209 [0.5 credit] (formerly 92.529)
(ELG 7113)
Topics in Systems and Control I
Current topics in the field, including linear semigroup theory and optimal feedback control.

EACJ 5300 (formerly 92.530)
(ELG 7114)
Topics in Systems and Control II
Current topics in the field, including linear and non-linear filtering and optimal control of stochastic systems.

EACJ 5301 [0.5 credit] (formerly 92.531)
(ELG 7574)
Sujets choisis en systèmes et réglage automatique.
Sujets d'intérêt courant dans le domaine.

EACJ 5305 [0.5 credit] (formerly 92.535)
(ELG 5108)
Electromagnetic Compatibility and Interference
Interference phenomena. Shielding of conductors. Grounding. Other noise reduction techniques. EMI filters. Noise sources: narrowband and broadband. Electromagnetic pulse as an interference source. Modeling EMI/C circuit boards and backplanes.
Prerequisite: ELG 4103 or the equivalent.

EACJ 5308 [0.5 credit] (formerly 92.538)
(ELG 7500)
Sujets choisis en électromagnétisme.
Sujets d'intérêt courant dans la matière.

EACJ 5401 [0.5 credit] (formerly 92.541)
(ELG 5104)
Electromagnetic Waves: Theory and Applications
The homogeneous wave equation. Uniform and non-uniform plane waves. Inhomogeneous wave equations. Green's functions. Theory of potentials. Scattering problems. Numerical methods. Boundary value problems. Perturbation and variational techniques.
Prerequisite: ELG 4101 or the equivalent.

EACJ 5402 [0.5 credit] (formerly 92.542)
(ELG 5379)
Numerical Methods in Electromagnetic Engineering
Review of electromagnetic and potential theory. Formulation of static and electrodynamic problems. Introduction to numerical and field-theoretical modeling techniques. Numerical methods considered: FD, MoL, SDA,TLM and BPM. Examples of commonly encountered electromagnetic problems at microwave, millimeter-wave and optical frequencies.
Prerequisites: ELG 4103 or the equivalent.

EACJ 5403 [0.5 credit] (formerly 92.543)
(ELG 5504)
Ondes électromagnétiques: théorie et applications
Équation homogène d'ondes. Ondes planes uniformes et non uniformes. Équation non homogène d'ondes. Fonctions de Green. Théories des potentiels. Problèmes de diffraction. Méthodes numériques. Problèmes avec conditions aux limites. Méthodes des perturbations et variation.
Prerequisite: ELG 4103 or the equivalent.

EACJ 5404 [0.5 credit] (formerly 92.544)
(ELG 7100)
Topics in Electromagnetics I
Current topics in the field.

EACJ 5405 [0.5 credit] (formerly 92.545)
(ELG 7101)
Topics in Electromagnetics II
Current topics in the field.

EACJ 5406 [0.5 credit] (formerly 92.546)
(ELG 5779)
Méthodes numériques en génie électromagnétique
Revue de l'électromagnétisme et de la théorie des potentiels. Formulation de problèmes statiques et electrodynamiques. Introduction aux methodes numériques et théoriques. Méthodes numeriques considerées: FD, MoL, SDA, TLM et BPM. Exemples de problèmes types rencontres en électromagnétisme aux hyperfréquences et en optique.
Prerequisite: ELG 4103 and ELG 4104, or the equivalent.

EACJ 5500 [0.5 credit] (formerly 92.550)
(ELG 5371)
Digital Communications by Satellite
Propagation and interference considerations. Link budget calculations. GEO, LEO, HEO systems. Transponders. Earth stations; modems (PSK,MSK,etc.), low noise amplifiers, high power amplifiers. Error control. Access techniques: FDMA, TDMA, CDMA, random access. Switching, onboard processing. Networking. ATM over satellites. Mobile satellite communications and IMT 2000.
Prerequisite: ELG 4171 or the equivalent.

EACJ 5501 [0.5 credit] (formerly 92.551)
(ELG 5170)
Information Theory
Measure of information: entropy, relative entropy, mutual information, asymptomatic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capactiy: random coding bound, reliability function, Blahut-Arimoto alorithm, Gaussian channels, coloured Gaussian noise and "water-filling"; Rate distortion theory; Network information theory.
Prerequisite: ELG 5119 (EACJ 5109) or SYSC 5503 (ELG 5119) or the equivalent.

EACJ 5503 [0.5 credit] (formerly 92.553)
(ELG 5179)
Detection and Estimation
Binary, M-ary, composite hypothesis testing. Bayes risk and Neyman-Pearson criteria. Parameter estimation: Cramer-Rao bounds; maximum-likelihood estimation. Detection in additive white Gaussian noise and coloured noise. Noise in noise problems. Classical estimation problems. Linear filtering problem. Weiner/Kalman filtering. Sequential and non-parametric detection.
Prerequisites: ELG 5119 or SYSC 5503; and ELG 5375 or SYSC 5504; or the equivalents.

EACJ 5504 [0.5 credit] (formerly 92.554)
(ELG 5372)
Error Control Coding
General introduction Algebraic concepts. Linear block codes. Cyclic codes, BCH and Reed-Solomon codes. Convolutional codes. Maximum likelihood decoding, and sequential decoding of convolutional codes. Burst-error correcting confolutional and block codes. Automatic repeat request. Trellis Coded Modulation. Trubo codes and iterative decoding.
Co-requisite: ELG 4171 or the equivalent.

EACJ 5506 [0.5 credit] (formerly 92.556)
(ELG 5375)
Principles of Digital Communication
Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Analysis of digital data transmission techniques for additive Gaussian noise channels. Efficient modulation and coding for reliable transmission.

Spread spectrum and line coding techniques. Precludes additional credit for SYSC 5504. Prerequisite: SYSC 5503 or ELG 5119 or the equivalent (may be taken concurrently).

EACJ 5507 [0.5 credit] (formerly 92.557)
(ELG 5376)
Digital Signal Processing
Review of discrete time signals and systems, A/D and D/A conversions, representation in time, frequency, and Z domain, DFT/FFT transforms, FIR/IIR filter design, quantization effects. Correlation functions. Cepstrum analysis. Multi-rate signal processing. Power spectrum estimation. Introduction to joint time-frequency analysis. DSP architecture: implementation approaches. Applications
Precludes additional credit for SYSC 5602 (ELG 6162).

EACJ 5508 [0.5 credit] (formerly 92.558)
(ELG 5776)
Traitement numérique des signaux
Revue des signaux/systèmes en temps discret, conversions A/N et N/A, représentation en temps, fréquence et domaine Z, transformées DFT/FFT, design filtres FIR/IIR, effets de quantification. Fonctions de corrélation. Analyse cepstrale. Traitement à taux multiple. Estimation de puissance spectrale. Introduction analyse temps-fréquence. Architectures DSP: réalisations. Applications.
Precludes additional credit for SYSC 5602 (ELG 6162)

EACJ 5509 [0.5 credit] (formerly 92.559)
(ELG 5378)
Image Processing and Image Communications
Image acquisition, display and perception: sampling and reconstruction, quantization, human vision. Discrete image representations.: colour spaces, blick, subband and wavelet representations. Image transformation, enhancement and restoration. Image analysis: edge detection, motion estimation. Image and video compression: loseless coding, predictive and transform coding, motion compensation.
Prerequisite: ELG 5376 or SYSC 5602 or the equivalent.

EACJ 5600 [0.5 credit] (formerly 92.560)
(ELG 7172)
Topics in Signal Processing I
Current topics in the field.

EACJ 5601 [0.5 credit] (formerly 92.561)
(ELG 7173)
Topics in Signal Processing II
Current topics in the field.

EACJ 5603 [0.5 credit] (formerly 92.563)
(ELG 7179)
Topics in Signal Processing III
Current topics in the field.

EACJ 5605 [0.5 credit] (formerly 92.565)
(ELG 7177)
Topics in Communications I
Current topics in the field.

EACJ 5606 [0.5 credit] (formerly 92.566)
(ELG 7178)
Topics in Communications II
Current topics in the field.

EACJ 5607 [0.5 credit] (formerly 92.567)
(ELG 5374)
Computer-Communication Networks
Network applications, structures and their design issues. Resource sharing/access methods. Network transmission and switching techniques. OSI model. Error control, flow control and various issues related to the physical, data link and network layers. Local area networks. Performance issues of delay-throughput in various protocols
Precludes additional credit for SYSC 5201.
Prerequisite: An undergraduate course in probability and statistics such as MAT 2377.

EACJ 5702 [0.5 credit] (formerly 92.572)
(ELG 7572)
Sujets choisis en télécommunications et en traitement de signaux.
Sujets d'intérêt courant dans le domaine.

EACJ 5703 [0.5 credit] (formerly 92.573)
(ELG 5194)
Design and Testing of Reliable Digital Systems
Introduction. Test generation for combinatorial circuits. Fault detection in sequential circuits. Memory testing. LSI/VLSI circuit testing. Deterministic and random testing of digital circuits. Design for testability. Self-checking circuits. Design of fault-tolerant systems. Case studies.
Prerequisite: ELG 5195 or the equivalent.

EACJ 5704 [0.5 credit] (formerly 92.574)
(ELG 5180)
Advanced Digital Communication
Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels; diversity concepts, modeling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels.
Precludes additional credit for SYSC 5605.
Prerequisite: SYSC 5504 or ELG 5375 or the equivalent.

EACJ 5705 [0.5 credit] (formerly 92.575)
(ELG 5195)
Digital Logic Design: Principles and Practices
Switching algebra. Combinational circuit design including PLA and MSI techniques. Special properties-symmetric functions, unate functions, threshold functions, functional decomposition. Sequential circuits-state reduction, incompletely specified machines, state assignments and series-parallel decomposition. Fundamental mode sequential circuits-race, hazards, and state assignment. Semicustom and MSI design. Special sequential circuits.

EACJ 5709 [0.5 credit] (formerly 92.579)
(ELG 5196)
Neural Networks and Fuzzy Systems
Neuro-fuzzy and soft computing. Fuzzy set theory: rules, reasoning, and inference systems. Regression and optimization; derivative-based optimization-genetic algorithms, simulated annealing, downhill simplex search. Neural Networks: adaptive networks; bidirectional associative memories; supervised and unsupervised learning; learning from enforcement. Applications.
Precludes additional credit for SYSC 5601 (ELG 6161).

EACJ 5800 [0.5 credit] (formerly 92.580)
(ELG 5377)
Adaptive Signal Processing
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares; convergence and tracking performance; implementation. Applications , such as adaptive prediction; channel equalization; echo cancellation; source coding; antenna beamforming; spectral estimation.
Precludes additional credit for Engineering ELG 6160.
Prerequisite: SYSC 5503 or ELG 5119 or the equivalent; SYSC 5602 or ELG 5376 or the equivalent.

EACJ 5807 [0.5 credit] (formerly 92.587)
(ELG 7186)
Topics in Computers I
Current topics in the field.

EACJ 5807 [0.5 credit] (formerly 92.587) (ELG 7187)
Topics in Computers II
Current topics in the field.

EACJ 5900 [0.5 credit] (formerly 92.590)
(ELG 7573)
Sujets choisis sur les ordinateurs.
Sujets d'intérêt courant dans la matière.

EACJ 5206 [0.5 credit] (formerly 92.526)
(ELG 5123)
Health Care Engineering
Overview of health care system/participants: biophysical measurements for diagnosis/ monitoring; biomedical sensors/technology; telemedicine and applications; safety considerations; managing medical technologies/ funding models for clinical engineering departments; considerations for developing countries.
Prerequisites: Permission of the Department.

EACJ 5204 [0.5 credit] (formerly 92.524)
(ELG 5124)
Virtual Environments
Basic concepts. Virtual worlds. Hardware and software support. World modeling. Geometric modeling. Light modeling. Kinematic and synmaic models. Other physical modeling

modalities. Multi-sensor data fusion. Anthropomorphic avatars. Animation: modeling languages.. scripts, real-time computer architectures. VE interfaces. Case studies.

EACJ 5205 [0.5 credit] (formerly 92.525) (ELG 5125)
Quality of Service Management for Multimedia Applications
Design principles: layering, protocols, interfaces; open distributed processing models; real-time requirement; request-response and stream processing, real-time scheduling, design for performance and scalability; user perspective versus system performance, cost/ performance trade-offs, negotiations; adaptive and mobile applications; examples of multimedia applications, protocols.
Prerequisite: Engineering EACJ 5607 (ELG 5374) or SYSC 5201 (ELG 6121) or equivalent.

EACJ 5206 [0.5 credit] (formerly 92.526) (ELG 5126)
Source Coding and Data Compression
Discrete and continuous sources. Discrete sources: Huffman coding and run length encoding. Continuous sources: waveform construction coding: PCM, DPMC, delat modulation, speech compression by paramater extraction; predictive encoding; image coding by transformation and block quantization. Fourier and Walsh transform coding. Applications to speech, television, facsimile.
Prerequisite: SYSC 5503 (ELG 6153) or ELG 5119 (EACJ 5109); or equivalent.

ELG 6000
Engineering Report/Rapport technique
For students in the course work master's program working on the Engineering Report. Pour les étudiants et les étudiantes à la maîtrise qui préparent un rapport technique.

ELG 7999
M.A.Sc. Thesis/Thèse de M.Sc.A.
For students working towards their master's thesis. Pour les étudiants et les étudiantes qui travaillent à leur thèse de maîtrise.

ELG 8000
Co-Op Work Term I/Travail coopératif 1er stage
For students in a cooperative master's program who are on their first work term.
Pour les étudiants et les étudiantes à un programme coopératif de maîtrise qui font leur première session de travail.

ELG 8001
Co-Op Work Term II/Travail coopératif 2e stage
For students in a cooperative master's program who are on their second work term.
Pour les étudiants et les étudiantes à un programme coopératif de maîtrise qui font leur deuxième session de travail.

ELG 9998
Ph.D. Comprehensive Exam/Examen de synthèse du doctorat
For students undergoing the Ph.D. comprehensive examination.
Pour les étudiants et les étudiantes qui doivent passer l'examen de synthèse du doctorat.

ELG 9999
Ph.D. Thesis/Thèse de doctorat
For students working towards their Ph.D. thesis. Pour les étudiants et les étudiantes qui travaillent à leur thèse de doctorat.

English Language and Literature

Dunton Tower 1812
Telephone: (613) 520-2310
Fax: (613) 520-3544
Web site: www.carleton.ca/english/

The Department

Chair of the Department: L.T.R. McDonald

Departmental Supervisor of Graduate Studies: R. Holton

The Department of English Language and Literature offers programs of study leading to the M.A. degree in English language and literature. Additional information may be obtained by consulting the departmental supervisor of graduate studies.

Qualifying-Year Program

Applicants who hold a general (3-year) B.A. degree with at least a high honours standing (normally B+), with a major in English language and literature, may be admitted to the qualifying-year program. Normally, these students will be required to complete 4.0 or 5.0 credits in English, as determined by the department, and to maintain a high honours standing (normally B+) before being considered for admission into the master's program. For more information regarding the qualifying year, see the General Regulations section of this Calendar.

Master of Arts

Admission Requirements

The minimum admission requirement for the master's program is a B.A. (Honours) (or the equivalent) in English language and literature, with at least a high honours standing (normally B+ or better)

Possession of the minimum entrance standing is not in itself, however, an assurance of admission into the program.

Program Requirements

Each candidate will select one of the following program patterns:

• 2.0 credits in English, selected from those at the 5000-level (excluding ENGL 5908), plus ENGL 5005, and a master's thesis; an oral examination on the thesis will be required. A prospectus for the thesis must be submitted to the graduate committee by December 1 after registration in September, or at the end of three months for any other registration

• 3.0 credits in English selected from those at the 5000-level (excluding ENGL 5909), plus ENGL 5005, and a research essay; an oral examination on the research essay will be required

Each program is designed to be completed within the three-term academic year. Each program is of equal status.

Guidelines for Completion of Master's Degree

Full-time master's candidates are expected to complete all requirements in twelve months or three terms of registered full-time study. Part-time master's candidates are expected to complete their degree requirements within an elapsed period of six calendar years after the date of initial registration.

All candidates are required to demonstrate a reading knowledge of one language other than English, approved by the Department.

Academic Standing

A standing of B- or better must be obtained in each credit counted towards the master's degree.

Graduate Courses

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

ENGL 5000 [0.5 credit] (formerly 18.500)
Literary Criticism
A study of specific topics or particular areas of literary criticism. (Also listed as CLST 5002.)

ENGL 5002 [0.5 credit] (formerly 18.502)
Contemporary Literary Theory
This course examines contemporary approaches to theory and literary studies. The first half of the semester is devoted to an overview of current theoretical approaches to literature, and the second half focuses on the work of Sigmund Freud, Jacques Derrida, and Michel Foucault.

ENGL 5003 [0.5 credit] (formerly 18.503)
Feminism/s: The Literary Dimension
An examination of the configurations and discursive constructions of various cultural "spectacles," such as certain murder trials, disease outbreaks, sexual scandals, and violence in (and out of) sport; performance of race and gender in popular culture and how these performances influence cultural assumptions and expectations.

ENGL 5004 [0.5 credit] (formerly 18.504)
Literature, Contact, and Empire in Colonial and Post-Colonial Societies
An investigation of specific European and North American documents relating to the dispossession of Native peoples from the Caribbean to the Arctic, together with the emergence of a radical critique by various Native and non-Native thinkers (Columbus, Montaigne, Cartier, Defoe, Hearne, Cooper, Jameson, Thompson, etc.)

ENGL 5005 [0.5 credit] (formerly 18.505)
Bibliography and Scholarly Methods
An introduction to analytical and descriptive bibliography, editing, research methodology, and professional concerns. The course is graded Satisfactory/Unsatisfactory.

ENGL 5108 [0.5 credit] (formerly 18.518)
Old Norse
Topic may vary from year to year.

ENGL 5208 [0.5 credit] (formerly 18.528)
Middle-English Studies
A study of selected portions of Chaucer's *Canterbury Tales*. Also offered at the undergraduate level, with different requirements, as ENGL 4208, for which additional credit is precluded.

ENGL 5301 [0.5 credit] (formerly 18.531)
Renaissance Poetry
Topic may vary from year to year.

ENGL 5302 [0.5 credit] (formerly 18.532)
Seventeenth-Century Poetry
A study of selected seventeenth-century poets.

ENGL 5304 [0.5 credit] (formerly 18.534)
Renaissance Drama
Politics and the English Renaissance Stage. A study of the popular drama of Marlowe, Shakespeare, Jonson, Marston, Webster, and Tourneur, and the court drama of Peele, Jonson, Shirley, and Carew.

ENGL 5307 [0.5 credit] (formerly 18.537)
Renaissance Authors
A study of selected Renaissance authors.

ENGL 5308 [0.5 credit] (formerly 18.538)
Renaissance Studies
Topic may vary from year to year.

ENGL 5402 [0.5 credit] (formerly 18.542)
Eighteenth-Century Studies
Depictions of Friendship and Gender. An examination of the writings of Swift, Pope, and Johnson with respect to the concept of friendship and the depiction of gender. Works are examined from historical, biographical, and psychological points of view.

ENGL 5408 [0.5 credit] (formerly 18.548)
Studies in Romanticism
An examination of the fantastic element in some key texts of Romantic literature. The emphasis is on imaginative structures and on the romantic exploration of the mysterious, the exotic, and the forbidden.

ENGL 5501 [0.5 credit] (formerly 18.551)
Nineteenth-Century Studies
A study of works written between 1830 and 1870 in terms of gender representation in relation to generic modalities, exploring the thesis that poets of the period - Tennyson, the Brownings, the Rossettis, Arnold, Clough - confronted a crisis in gender ideology that problematized the lyric.

ENGL 5503 [0.5 credit] (formerly 18.553)
Nineteenth-Century Fiction
Topic may vary from year to year.

ENGL 5508 [0.5 credit] (formerly 18.558)
Nineteenth-Century Literature
Topic may vary from year to year.

ENGL 5601 [0.5 credit] (formerly 18.561)
Twentieth-Century Poetry
Topic may vary from year to year.

ENGL 5603 [0.5 credit] (formerly 18.563)
Twentieth-Century Fiction
A study of selected twentieth-century writers.

ENGL 5604 [0.5 credit] (formerly 18.564)
Twentieth-Century Drama
Topic may vary from year to year.

ENGL 5606 [0.5 credit] (formerly 18.566)
Twentieth-Century Literature
A study of the portrayal of the media as a reflection of society and its values in the twentieth-century British novel, starting with Evelyn Waugh's Scoop and completing the survey with Fay Weldon's Darcy's *Utopia* and Martin Amis's *The Information*.

ENGL 5607 [0.5 credit] (formerly 18.567)
Twentieth-Century Authors
A study of twentieth-century authors of fiction.

ENGL 5608 [0.5 credit] (formerly 18.568)
Twentieth-Century Studies
Topic may vary from year to year.

ENGL 5701 [0.5 credit] (formerly 18.571)
American Poetry
A study of the formative poetry and poetics of several major modern American writers, including: Whitman, T.S. Eliot, Ezra Pound, William Carlos Williams, H.D., George Oppen, Charles Olson, and Robert Creeley.

ENGL 5703 [0.5 credit] (formerly 18.573)
American Fiction
Topic may vary from year to year.

ENGL 5706 [0.5 credit] (formerly 18.576)
American Literature
Topic may vary from year to year.

ENGL 5708 [0.5 credit] (formerly 18.578)
Studies in American Fiction
Topic may vary from year to year.

ENGL 5801 [0.5 credit] (formerly 18.581)
Canadian Poetry
Topic may vary from year to year.

ENGL 5802 [0.5 credit] (formerly 18.582)
Ethnicity, Multiculturalism, and Canadian Literature
A study of Canadian literature in relation to theoretical and critical issues posed by ethnicity and other aspects of Canadian cultural diversity.

ENGL 5803 [0.5 credit] (formerly 18.583)
Canadian Fiction
The course concentrates on Canadian writing of the last twenty to thirty years, exploring it with reference to the concept of ideology, within the contexts of Marxist, feminist, and postmodernist literary theories.

ENGL 5805 [0.5 credit] (formerly 18.585)
Canadian English
Topic may vary from year to year.

ENGL 5807 [0.5 credit] (formerly 18.587)
Selected Topics in Canadian Literature
Topic may vary from year to year.

ENGL 5809 [0.5 credit] (formerly 18.589)
Colonial Discourse and Native Literatures in Canada
Topic may vary from year to year.

ENGL 5900 [0.5 credit] (formerly 18.590)
Selected Topic
Topic may vary from year to year.

ENGL 5901 [0.5 credit] (formerly 18.591)
Selected Topic
Topic may vary from year to year.

ENGL 5903 [0.5 credit] (formerly 18.593)
English and Cultural Studies
Performing Bodies and Voices: A consideration of the juncture of literature and popular culture in the twentieth-century American and Canadian contexts. An examination of fusional blues lyric, Beat poetry, folk lyrics, performance art, comic book testimony, rap, Native and gay theatre, spoken word poetry, and dub poetry.

ENGL 5904 [0.5 credit] (formerly 18.594)
Special Studies in Dramatic Literature
Topic may vary from year to year.

ENGL 5908 [1.0 credit] (formerly 18.598)
Research Essay

ENGL 5909 [2.0 credits] (formerly 18.599)
M.A. Thesis

Undergraduate Courses

Graduate students may take the equivalent of 1.0 credit at the senior undergraduate level.

Other Disciplines

Graduate students may take the equivalent of 1.0 credit in a related discipline. The following courses may be among those of special interest:

Comparative Literary Studies
CLST 5001, CLST 5002

This is not a complete list of all acceptable options. Students should contact the supervisor of graduate studies or the chair of the Department for approval if there are other courses they wish to take which are not on the list.

Other Universities

Graduate students may take the equivalent of 2.0 credits at another university or other universities. Students are especially reminded that the University of Ottawa offers a wide range of graduate courses which may be completed (under the general 2.0 credit ruling) for credit at Carleton University.

Ottawa-Carleton Institute for Environmental Engineering

Carleton University
Minto 3091, 1125 Colonel By Drive
Ottawa, ON, Canada K1S 5B6
Email: ociene@carleton.ca
Telephone: (613) 520-5659
Fax: (613) 520-5682

Application packages available at
www.gs.carleton.ca/kits/index.html

Information relating to program requirements:
www.ociene.ca

The Institute

Director of the Institute, Deniz Karman

Established in 2000, the Institute combines the research strengths and resources of the Department of Civil and Environmental Engineering at Carleton University and the Department of Civil Engineering and the Department of Chemical Engineering at the University of Ottawa. Programs leading to M.Eng., M.A.Sc. and Ph.D. degrees in Environmental Engineering are available through the Institute. Registration will be at the university with which the student's supervisor is affiliated. Requests for admission may be sent to the Director of the Institute. Related fields of study and research in environmental engineering are also available through the Ottawa-Carleton Institute for Civil Engineering (which offers graduate degrees in Civil Engineering) and the Department of Chemical Engineering at the University of Ottawa (which offers graduate degrees in Chemical Engineering).

Members of the Institute and Their Major Research Interests

Members of the Institute are listed below. The "home" department of each member is indicated by (C) for the Department of Civil and Environmental Engineering at Carleton University, (CVG) for the Department of Civil Engineering at the University of Ottawa, and (CHG) for the Department of Chemical Engineering at the University of Ottawa.

- Pascale Champagne, *Environmental Engineering, Passive Treatment Systems, Acid Mine Drainage (AMD) Mitigation, Composting and Solid Waste Management* (C)

- Ronald L. Droste, *Water and Wastewater Treatment Process Modeling, Watershed Modeling* (CVG)

- Leta Fernandes, *Agricultural and Solid Waste Management, Wastewater Treatment, Bioremediation* (O)

- Deniz Karman, *Air Pollution and Control, Motor Vehicle Emissions and Urban Air Quality* (C)

- Kevin J. Kennedy, *Municipal and Industrial Wastewater Treatment, Advanced Anaerobic Digestion Processes, Anaerobic Digestion Processes, Fate of Contaminants in Wastewater Treatment* (CVG)

- Boguslaw Kruczek, *Membrane Gas Separation Processes* (CHG)

- Takeshi Matsuura, *Membrane Separation Processes* (CHG)

- David D. McLean, *Modeling, Control, Optimization and Robust Design of Waste Treatment Processes* (CHG)

- Roberto M. Narbaitz, *Physicochemical Water and Wastewater Treatment, Solid Waste Management* (CVG)

- Wayne J. Parker, *Waste Water Treatment, Fate of Contaminants in Engineered and Natural Systems, Biological Processes.* (C)

- Gilles G. Patry, *Wastewater Treatment Process Simulation and Control* (CVG)

- T. Sampat Sridhar, *Environmental Impact Assessment, Wastewater Treatment, Hazardous and Radioactive Waste, Pollution Control* (C)

- F. Handan Tezel, *Air Pollution Control, Water Pollution Control, Environmental Engineering* (CHG)

- André Y. Tremblay, *Synthetic Membranes, Process and Wastewater Treatment, Air Pollution and Control* (CHG)

- Paul J. Van Geel, *Groundwater Flow and Contaminant Transport, Waste Disposal* (C)

Master's Program

Admission Requirements

The normal requirement for admission to the master's program in Environmental Engineering is a four-year bachelor's degree in Environmental Engineering, other related engineering disciplines (Civil, Chemical, Mechanical, etc.), or Environmental Science disciplines.

All students entering the program are required to have courses in mathematics, probability and statistics equivalent to courses required in undergraduate engineering programs. Students admitted without full equivalency in these areas are expected to take appropriate undergraduate courses early in their studies. These courses will be additional to the normal degree requirements.

All students entering the program are also required to have taken undergraduate courses equivalent to the following:

MECH 2300 Introduction to Fluid Mechanics

ENVE 3001 Environmental Engineering Unit Operations

ENVE 3002 Environmental Engineering Systems Modeling

These courses are considered to provide the minimum background in fluid mechanics, and in physical, chemical, and biochemical treatment principles, necessary to adequately follow environmental engineering courses at the graduate level. Depending on their background, students may have been exposed to these principles through a different combination of courses in their undergraduate curriculum. Students entering the program without an equivalent background in these topics are expected to take these courses early in their studies and they are considered additional to those normally required for the degree.

Program Requirements

Study at the master's level can be pursued through either a thesis or a project option. The requirements for course work are specified in terms of credits. At Carleton University, 1.0 credit typically comprises three hours of lectures or seminars a week for two terms, or the equivalent. At the University of Ottawa, 1.0 course credit is one hour of instruction per week for one term. Thus 1.0 credit in Carleton University notation is equivalent to 6 course credits in the University of Ottawa notation.

Thesis Option

The requirements for the master's degree by thesis are as follows:

1) Completion of a minimum of (3.0) credits by course, with at least one course (0.5 credits) from each of at least three of the areas of study listed below;

2) Participation in the graduate seminar series (ENVE 5800);

3) Completion and successful oral defence of a research thesis (equivalent to 3.0 credits).

Project Option

The requirements for students who pursue the project option are participation in the graduate seminar series, and the completion of 6 credits, including (4.5) course credits, and a project equivalent to the remaining (1.5) credits.

Breadth Requirement

In keeping with the objective of ensuring a breadth of knowledge for graduates of the program, students in the master's program are expected to take at least one graduate level course from each of at least three of the following areas of study:

Air Pollution

Water Resources Management, Groundwater Management and Contaminant Transport

Management of Solid, Hazardous, and Radioactive Waste, and Pollution Prevention

Water and Wastewater Treatment

Environmental Impact Assessment

This requirement serves the objectives of educating graduate professionals who are not only specialized in one area but who are sufficiently familiar with problems and different approaches in the other areas to enable them to interact readily at a technical level with colleagues working in those areas. In addition to the courses associated with the individual areas, students will be encouraged to select courses from fundamental areas such as chemistry, numerical modeling, and applied statistics.

Master's or Ph.D. candidates transferring from another university must take at least half their courses at Carleton University.

Doctoral Program

Admission Requirements

The normal requirement for admission into the Ph.D. Program in Environmental Engineering is completion of either:

i) A Master's degree in Environmental Engineering or

ii) A Master's degree in an engineering discipline with an environmental specialization.

Students wishing to enter the program who do not have either of these backgrounds will be evaluated on a case-by-case basis. Additional course requirements may be specified in some cases.

Program Requirements

The requirements for the Ph.D. program (from a Master's degree) are as follows:

1) Completion of a minimum of 1.5 credits by course;

2) Participation in the graduate seminar series (ENVE 7800);

3) Successful completion of written and oral comprehensive examinations in subject areas determined by the advisory committee;

4) Successful presentation of the Ph.D. proposal before the advisory committee;

5) Completion and successful oral defence of a research thesis.

Master's students with outstanding performance in the master's courses may request transfer into the Ph.D. program without completing the master's degree. Students who are permitted to do so require 4.5 credits for a Ph.D., including any credits transferred from the Master's degree program.

Candidates in the Ph.D. program are expected to demonstrate a broad knowledge of the areas within environmental engineering (see "Breadth Requirement" under "Master's Program" above). Successful completion of the comprehensive examinations indicates that a candidate has acquired this knowledge. The comprehensive examinations, which normally should be completed within twelve months of registration, consist of at least three written exams in areas that are determined by the advisory committee and the candidate, and the defense of a written research proposal. One of the written exams is within the specific area of research of the candidate and serves to assess the depth of the candidate's background in this area. The remaining two exams serve to satisfy the objective of assessing the candidate's breadth of fundamental knowledge in two other areas of environmental engineering. These exams are selected by the candidate from a list that is proposed by the advisory committee. Upon completion of the written exams, an oral exam is held if requested by one or more of the committee members. The thesis proposal normally should be defended within 4 months of completion of the written exams.

Graduate Courses

Course selection is subject to the approval of the adviser or the Advisory committee. Students may choose courses offered at either university from among those listed below.

The courses listed below are grouped by area of study. Master's students must complete at least one course in three of the five areas. The Director will decide when a course offered under a Special Topics or Directed Studies heading can be considered to meet the requirements of a given area. Course descriptions may be found in the departmental sections of the calendars concerned. Course codes in parentheses are for University of Ottawa (CHG and CVG), and those that begin with the prefix "ENVE" or "CIVE" are offered at Carleton. Only a selection of courses is given in a particular academic year.

Air Pollution
ENVE 5101 (EVG 7101)

ENVE 5102 (CVG 7161)

ENVE 5103 (CVG 7162)

ENVE 5104 (EVG 7104)

(CHG 8132) ENVJ 5105 Adsorption Separation Processes

Water Resources Management, Groundwater Management, and Contaminant Transport
ENVE 5301 (EVG 7301)

ENVE 5302 (CVG 7163)

ENVE 5303 (EVG 7303)

CIVE 5504 (CVG 7108)

(CVG 5125) CIVJ 5601 Statistical Methods in Hydrology

(CVG 5126) CIVJ 5602 Stochastic Hydrology

(CVG 5131) CIVJ 5606 River Engineering

(CHG 8158) ENVJ5304 Porous Media

Management of Solid, Hazardous, and Radioactive Waste and Pollution Prevention
ENVE 5201 (EVG 7201)

ENVE 5202 (EVG 7202)

ENVE 5203 (CVG 7164)

(CVG 5133) ENVJ 5906 Solid Waste Disposal

(CVG 5179) ENVJ 5908 Anaerobic Digestion

(CVG 6315) ENVJ 6002 Sludge Processing, Utilization, and Disposal

Water and Wastewater Treatment
ENVE 5001 (EVG 5001)

(CVG 5130) ENVJ 5900 Wastewater Treatment Process Design

(CVG 5132) ENVJ 5901 Unit Operations of Water Treatment

(CVG 5134) ENVJ 5907 Chemistry for Environmental Engineering

(CVG 5135) ENVJ 5608 Water Supply and Sanitation in Developing Countries

(CVG 5136) ENVJ 5904 Water and Wastewater Treatment Laboratories

(CVG 5137) ENVJ 5905 Water and Wastewater Treatment Process Analysis

(CVG 5180) ENVJ 5909 Biological Nutrient Removal

(CHG 8181) ENVJ 5501 Biochemical Engineering

(CHG 8192) ENVJ 5502 Membrane Applications in Environmental Engineering

(CHG 8198) ENVJ 5503 Reverse Osmosis

Environmental Impact Assessment
ENVE 5401(EVG 7401)

Other Courses
To fulfil the requirements beyond the 1.5 credits of area courses, students may choose from the following:

ENVE 5402 (EVG 7402)

(CHG 8153)	ENVJ 5500	Statistical Modeling and Control of Dynamic Processes
(CHG 8186)	ENVJ 5506	Modeling of Steady-State Processes
(CHG 8194)	ENVJ 5504	Membrane Separation processes
(CHG 8195)	ENVJ 5505	Advanced Numerical Methods in Transport Phenomena
(CHG 8196)	ENVJ 5507	Interfacial Phenomena in Engineering
(CVG 5128)	ENVJ 5604	Water Resources Planning and Policy

Students may also, subject to approval, select courses from the graduate programs in Mechanical Engineering, Biology, Chemistry, Earth Sciences, Computer Sciences, Geography and Public Policy and Administration at both universities.

Seminars, Directed Studies and Special Topics
ENVE 5800 (EVG 7800)

ENVE 5906 (EVG 6108)

ENVE 5907 (EVG 6109)

ENVE 7800 (EVG 7801)

Projects and Theses
ENVE 5900

ENVE 5909

ENVE 6909

(EVG 6000) Environment Engineering Project

(EVG 7999) Master's Thesis

(EVG 9998) Comprehensive Examination

(EVG 9999) Ph.D. Thesis

European and Russian Studies

Paterson Hall 3A59
Telephone: (613) 520-2888
Fax: (613) 520-7501
Email: EURUS@carleton.ca
Web site: www.carleton.ca/EURUS/

The Institute

Director, Joan DeBardeleben

An interdepartmental committee was formed in 1963 to foster teaching, research, conferences, and publications in Soviet and East European studies at Carleton. In 1970, a separate department — the Institute of Soviet and East European Studies — was established to administer the interdisciplinary programs developed by the committee. Following the collapse of the Soviet Union at the end of 1991, the Institute of Soviet and East European Studies was renamed the Institute of Central/East European and Russian-Area Studies to reflect the changing political reality in the region. In 1998, the Institute was again renamed, this time as Institute of European and Russian Studies. With the change in name, the Institute's undergraduate program was expanded to cover all of Europe. At the graduate level, the Institute continues to offer an interdisciplinary Master of Arts program in Central/East European and Russian-Area Studies with the participation of faculty members from ten disciplines (art history, business, economics, geography, history, international affairs, law, political science, Russian, and sociology). They are joined on an occasional basis by visiting scholars from outside the University, including invited specialists from Eastern and Central Europe and the successor states to the USSR.

In recent years the Central and East European countries and the Soviet successor states have been in the midst of a transition from one type of socio-economic and political system to another, although they are still influenced by earlier historical experience, the common legacy of Soviet-style communism, and by a set of similar problems resulting from that legacy. Since the collapse of the Soviet Union, the field of study remains unified by a concern with understanding the nature of the transitional processes affecting the region, in their multiple social, cultural, economic, and political dimensions. At the same time, new dynamics affect the region. These include globalization, the increasing importance of international influences, and European integration (particularly the projected enlargement of the European Union to include countries of central and Eastern Europe.)

Institute courses and research programs focus on several broad themes. These themes are treated in historical context, with attention to historical roots and parallels of contemporary developments. Major themes include:

- legacy of the Soviet system in the region and its impact on contemporary developments

- transition periods in the history of the region, with particular emphasis on political, economic, and social dimensions of the post-communist transition

- nationalism and ethnicity as forces for change in the area

- international integration among countries of the region, and the reintegration of the region into European institutions and the larger international community

- environmental problems and policies in a comparative perspective

- the changing relationship between state and society, with attention to ethnic, class, and gender issues

At the undergraduate level, the Institute offers an interdisciplinary B.A.(Honours) program in European and Russian Studies. The Institute also administers a program of studies leading to a Master of Arts degree in Central/East European and Russian-Area Studies (CERAS), the first of its kind in Canada. The curricula for both programs are offered largely through participating departments. The M.A. program is designed for students wishing to acquire specialized knowledge of the region, including proficiency in the use of Russian and/or German as a research tool. The approach is interdisciplinary with emphasis on the social sciences and history. Students may take advantage of the university's regular academic exchanges with post-secondary institutions in Hungary, Poland, Germany, Slovakia, and Russia.

The diploma program in European Integration Studies is a supplemental qualification available to graduate students enrolled in an M.A. or Ph.D. degree program at Carleton. Students in the Institute's M.A. program may work concurrently towards their diploma in European Integration Studies.

Qualifying-Year Program

Applicants who have a general (3-year) bachelor's degree in one of the disciplines represented in the program, or who lack sufficient area studies or language training, may be admitted to a qualifying-year program designed to raise their status to that of honours graduates in European Studies. Students are expected to achieve high honours standing in qualifying-year courses in order to qualify for admission to the master's year.

Master of Arts

Admission Requirements

The normal requirement for admission to the master's program is an honours degree (or equivalent), with at least high honours standing.

Students may enter either a one-year or a two-year program. It is normally expected that students admitted to the one-year program will complete the degree within three academic terms of study, while students entering the two-year program will complete the degree in five to six academic terms. Students who participate in an academic exchange abroad will require longer to complete the program, but the Institute encourages such participation, since academic exchanges greatly enrich the experience of the student.

For admission to the one-year program, applicants must normally meet the following requirements:

- A B.A. Honours degree (or equivalent) including at least 5.0 credits (or the equivalent) in the field, normally covering three disciplines such as political science, history, economics, geography, literature, or international affairs (but excluding language courses); and

- A reading knowledge of Russian or German (normally equivalent to two academic years of German or Russian instruction or one year with an intensive summer program) or, at the discretion of the Institute, equivalent knowledge of another of the region's languages.

For admission to the two-year program, applicants must normally meet the following requirements:

- A B.A. Honours degree (or equivalent) in one of the social sciences (political science, economics, geography, sociology, etc.), history, international affairs, Slavic or German language and literature, or another related discipline;

- A reading knowledge of Russian or German (normally equivalent to two academic years of German or Russian instruction or one year with an intensive summer program) or, at the discretion of the Institute, equivalent knowledge of another of the region's languages; or

Some coursework or practical experience in the area of study. However, applicants admitted with minimal or no proficiency in an appropriate language will require additional language training beyond normal M.A. requirements.

Program Requirements

Students in the one-year master's program must complete 5.0 credits, including the following:

- EURR 5001, which is a 0.5 credit seminar in Central/East European and Russian-Area Studies, offered specially by the Institute and incorporating the approaches of several relevant disciplines

- EURR 5200 Research Design (0.5 credit), which is a seminar introducing students to a variety of methodological approaches and tools needed to design and implement research projects;

- 2.0 credits chosen with the approval of the graduate supervisor from the list below, with at least 1.0 credit (or the equivalent) at the 5000-level. No more than 1.0 credit may be taken at the 4000-level. No more than 0.5 credit may be taken in the Russian or German language discipline

- One of the following:

  EURR 5908 (1.0 credit), a research essay incorporating the approaches of at least two of the disciplines represented in the program; the research essay must be defended orally. The essay must be combined with an additional 1.0 credit, or the equivalent, chosen from those listed below (not including Russian).

  or

  EURR 5909 (2.0 credits), an M.A. thesis which must combine the interdisciplinary approach with a greater degree of originality than that required of the research essay, and which must be defended orally.

In both cases (EURR 5908, EURR 5909) the paper should demonstrate that its author is capable of undertaking research in Russian or German, or in another language used in the region. The EURR 5909 option cannot be taken without the specific permission of the graduate supervisor.

Students in the two-year master's program must complete 7.5 credits, consisting of the following:

- EURR 5000 and EURR 5001, which are two 0.5 credit seminars in Central/East European and Russian-Area Studies, offered specially by the Institute and incorporating the approaches of several relevant disciplines;

- Independent Study (1.0 credit, e.g., EURR 5906 or an approved equivalent), the content and structure of which will be determined in consultation with the graduate supervisor;

- EURR 5200 Research Design (0.5 credit), which is a seminar introducing students to a variety of methodological approaches and tools needed to design and implement research projects;

- 3.0 credits chosen with the approval of the graduate supervisor from the list below, with at least 1.5 credits (or the equivalent) at the 5000-level. No more than 1.5 credits may be taken at the 4000-level. No more than 0.5 credit may be taken in the Russian or German language discipline.

- One of the following:

  EURR 5908 (1.0 credits), a research essay incorporating the approaches of at least two of the disciplines represented in the program; the research essay must be defended orally. The essay must be combined with an additional 1.0 credit, or the equivalent, chosen from those listed below (not including Russian).

  or

  EURR 5909 (2.0 credits), an M.A. thesis which must combine the interdisciplinary approach with a greater degree of originality than that required of the research essay, and which must be defended orally.

In both cases (EURR 5908, EURR 5909) the paper should demonstrate that its author is capable of undertaking research in Russian or German, or in another language used in the region. The EURR 5909 option cannot be taken without the specific permission of the graduate supervisor.

For both the one and two year programs, each student must demonstrate proficiency in either Russian, German, or one of the region's other languages. A list of languages that may be selected to meet this requirement is available from the Institute. If the research essay or M.A. thesis involves the study of Russia, then language proficiency must be demonstrated in the Russian language. If the research essay involves the study of Germany, then language proficiency must be demonstrated in the German language. If a language other than Russian or German is selected (a) this language must be utilized in undertaking research for the research essay or M.A. thesis; (b) its selection must be approved by the graduate supervisor; and (c) the student must demonstrate proficiency in the language by passing a written translation examination.

Proficiency in Russian, German, or another approved language may be demonstrated by successful completion of a written translation examination to be administered by the Institute. Proficiency in Russian may also be demonstrated by completion of RUSS 4200 (Russian Syntax and Translation) and RUSS 4201 (Russian for the Social Sciences) with a minimum grade of B+.

Students entering the M.A. program with minimal or no language proficiency will require extra coursework and/or summer language training to meet the language proficiency requirement.

Proposed plan of study for one year program students:

Year One (including summer or first term of second year):

- EURR 5200 Research Design (First term) (0.5 credit)
- EURR 5001 Interdisciplinary Seminar II (Second term) (0.5 credit)
- EURR 5908 Research Essay (1.0 credit) and 3.0 additional course credits

or

- EURR 5909 M.A. Thesis (2.0 credits) and 2.0 additional course credits

Proposed plan of study for two year program students:

Year One:

- EURR 5000 (First term) Interdisciplinary Seminar I (0.5 credit)
- EURR 5001 (Second term) Interdisciplinary Seminar II (0.5 credit)
- EURR 5906 (First and second terms) Independent Study (or equivalent course as approved by the graduate supervisor) (1.0 credit)
- 2.0 additional course credits

Year Two:

- EURR 5200 (First term) Research Design (0.5 credit)
- EURR 5908 Research Essay (full year) (1.0 credit) and 2.0 additional course credits

or

- EURR 5909 M.A. Thesis (full year, 2.0 credits) and 1.0 additional course credits.

Students are advised to consult with the relevant departments for final course listings for 2002-2003, as curricular changes may be made too late for inclusion in the Graduate Calendar; not all of the courses are offered every year. Undergraduate courses below the 4000- level may be taken by qualifying-year students, and by students in the M.A. program as supplementary to the minimum M.A. requirements. (See the program description for the Institute in the Undergraduate Calendar.)

Art History
ARTH 4202 Topics in Eastern Medieval Art

Economics
ECON 4806 Comparative Economic Systems I

ECON 4807 Comparative Economic Systems II

ECON 5806, ECON 5807

Geography
GEOG 4600 The Changing Geography of Post-Communist Societies

GEOG 5700

History
HIST 4105 Seminar on European History

HIST 4600 Seminar on Russian History

HIST 4602 History of Canadian-Soviet Relationships, 1919-1991

HIST 5600, HIST 5602, HIST 5800

International Affairs
INAF 5202, INAF 5308, INAF 5602, INAF 5804

Law
LAWS 4806 The Civilist Tradition

Political Science
PSCI 4601 Foreign Policies of Soviet Successor States

PSCI 5104, PSCI 5105, PSCI 5106, PSCI 5806

Russian
RUSS 4200 Russian Syntax and Translation

RUSS 4201 Russian for the Social Sciences

Sociology
SOCI 5804

European and Russian Studies
EURR 4002 State Society Relations in Transition

EURR 4003 Social and Political Perspectives in Europe

EURR 4005 Environmental Problems and Politics in East Central Europe and Eurasia

EURR 4006 The Business Environment in East Central Europe and the Soviet Successor States

EURR 4007 Social and Political Discourse in Russia

EURR 4008 Nationalism and Ethnic Conflict in Eastern and Central Europe

EURR 4100 Nation Building in Central and Eastern Europe

EURR 4101 The Balkans

EURR 5000, EURR 5001, EURR 5002, EURR 5003, EURR 5005, EURR 5007, EURR 5008, EURR 5100, EURR 5102, EURR 5103, EURR 5104, EURR 5105, EURR 5106, EURR 5107, EURR 5900, EURR 5901, EURR 5902, EURR 5903, EURR 5904, EURR 5905, EURR 5906

Other 4000- and 5000-level courses may be approved by graduate advisers as Institute of European and Russian Studies credits if they are deemed appropriate to a particular student's objectives.

Academic Standing

Master's candidates must obtain a grade of B- or better on each credit counted towards the degree.

Guidelines for Completion of Master's Degree

Students in the two-year M.A. program normally are expected to complete all requirements for the master's degree in five to six terms. Students entering the one year program with sufficient proficiency in Russian, German, or another approved language are expected to complete the degree within one calendar year or three terms of study. Students participating in international exchanges will normally require longer to complete degree requirements.

Diploma in European Integration Studies

This diploma program is only open to students currently enrolled in a graduate degree program at Carleton University and is intended to provide an additional qualification to the student's main degree. Applications to the program should be made to the Institute of European and Russian Studies. Some previous coursework or practical experience in the field of European Studies is a prerequisite for admission to the program. The purpose of the diploma program is to supplement the student's program of study by providing in-depth study of processes of European integration from an interdisciplinary perspective and thus to prepare the student for professional work or further study in this field.

Students must complete 2.5 credits of coursework. No more than 1.5 of the course credits counted toward the student's main degree program can be counted toward the diploma program. In addition to English, the student must demonstrate proficiency in a second European language (approved languages are subject to the discretion of the Institute), as certified by a language examination.

Required courses:

- EURR 5003;

- At least two of the following:

PSCI 5504 Topics in West European Politics

INAF 5804 International Relations in Europe

EURR 5102 The International Political Economy of Transition (also listed as INAF 5802); EURR 5104 European Integration and European Security (also listed as PSCI 5608); EURR 5105 European Economic Integration; EURR 5106 Selected Topics in European Integration Studies (also listed as PSCI 5609);

- And one additional credit, which may include courses from the following:

ECON 5401 Public Economics: Expenditure; ECON 5402 Public Economics: Taxation; ECON 5601 International Trade: Theory and Policy; ECON 5602 International Monetary Theory and Policy; ECON 5806 Comparative Economic Systems I; ECON 5807 Comparative Economic Systems II; PSCI 5105 Post-Communist Politics in East Central Europe; PSCI 5106 Selected Problems in the Politics of Soviet Successor States; PSCI 5503 Topics in West European Politics; PSCI 5509 Governing in the Global Economy; PSCI 5807 Analysis of International Organizations; PSCI 5808 International Political Economy; INAF 5308 International Trade: Theory and Policy; INAF 5309 International Finance: Theory and Policy.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

EURR 5000 [0.5 credit] (formerly 55.500)
Interdisciplinary Seminar I
An overview of approaches to the field of study from a variety of disciplinary perspectives for students with limited background in the field. The course is open to graduate students from a variety of departments with permission of the Institute.

EURR 5001 [0.5 credit] (formerly 55.501)
Interdisciplinary Seminar II
Examination of current debates and discussions within various academic disciplines relating to Central and Eastern Europe, and the Soviet successor states. The seminar also provides students with an opportunity to explore themes related to the research essay. Some background in the field is assumed.
Prerequisite: Permission of the Institute or enrolment in the CERAS M.A. program.

EURR 5002 [0.5 credit] (formerly 55.502)
State-Society Relations in Transition
The relationship between social forces and state structures at both the national and local levels in the USSR and the post-communist states. Also offered at the undergraduate level with different requirements as EURR 4002, for which additional credit is precluded.

EURR 5003 [0.5 credit] (formerly 55.503)
Social and Political Perspectives in Europe
The emergence of a European polity, identity and culture. Examination of whether "Europe" as a defined entity exists and the ways in which we may try to understand its evolution. Also offered at the undergraduate level with different requirements as EURR 4003, for which additional credit is precluded.

EURR 5005 [0.5 credit] (formerly 55.505)
Environmental Problems and Politics in East/ Central Europe and Eurasia
Nature, origins and policy responses viewed from economic, political and geographic perspectives. Also offered at the undergraduate level, with different requirements, as EURR 4005, for which additional credit is precluded.
Prerequisite: 1.0 credit in the area of East European or environmental studies, or permission of the Institute.

EURR 5007 [0.5 credit] (formerly 55.507)
Social and Political Discourse in Russia
Contemporary, social and political issues as covered in Russian-language media. Most course reading and instruction is in the Russian-language but student participation may be in English or Russian. Also offered at the undergraduate level, with different requirements, as EURR 4007, for which additional credit is precluded.
Prerequisite: Appropriate facility in the Russian language and permission of the Institute.

EURR 5008 [0.5 credit] (formerly 55.508)
Nationalism and Ethnic Conflict in Eastern and Central Europe
Ethnic basis of nationalism in the region. Ethnic politics and trends. Also offered at the undergraduate level, with different requirements, as EURR 4008, for which additional credit is precluded.

EURR 5100 [0.5 credit] (formerly 55.510)
Nation-Building in Central and Eastern Europe
Processes of nation building in the region examined in terms of a particular country, or set of countries. Country focus may vary. Also offered at the undergraduate level, with different requirements, as EURR 4100, for which additional credit is precluded.

EURR 5102 [0.5 credit] (formerly 55.512)
The International Political Economy of Transition
Problems of reintegration into the world economy and dilemmas of transition from command to market economies. Topics may include new trade and investment patterns, role in regional and international economic organizations, search for appropriate exchange rate policies, impact of Western assistance. (Also listed as INAF 5802.)

EURR 5103 [0.5 credit] (formerly 55.513)
Sustainability and Development in the Arctic: Transformations in the Circumpolar North
The Circumpolar Arctic Region is undergoing rapid political, economic, social and technological development, which impacts sustainability. Climate, contaminants and biological diversity focus international attention. Nunavut, the Russian North, major developments, and international circumpolar regime formation will be discussed, with significant emphasis on environment and development. (Also listed as GEOG 5700.)

EURR 5104 [0.5 credit] (formerly 55.514)
European Integration and European Security
A seminar focusing on security issues related to the formation of supra-national decision-making structures in Europe. Also offered at the undergraduate level with different requirements, as EURR 4104, for which additional credit is precluded. (Also listed as PSCI 5608.)

EURR 5105 [0.5 credit] (formerly 55.515)
European Economic Integration
A seminar focusing on economic issues and policies related to the process of European integration and the development of the European Union in the post-World War II period. Prerequisite: ECON 1000.

EURR 5106 [0.5 credit] (formerly 55.516)
Selected Topics in European Integration Studies
A seminar focusing on selected topics related to European integration in the post-World War II period. (Also listed as PSCI 5609.)

EURR 5107 [0.5 credit]
Russia and the New World Order, 1992 to the Present
An examination of how the Russia Federation has sought a place for itself in the world order since the collapse of the USSR up until the present. Also offered at the undergraduate level, with different requirements, as EURR 4107, for which additional credit is precluded.

EURR 5200 [0.5 credit] (formerly 55.520)
Research Design
Overview of research methods. Formulation of research problems. Hypotheses and hypothesis testing. Comparative and Case Study Approaches. Research Materials. Qualitative and quantitative approaches. Policy research. Discussion of student research proposals.

EURR 5900 [0.5 credit] (formerly 55.590)
Tutorial in Russian-Area Studies
A course of directed readings on selected aspects of the Soviet successor states, involving preparation of papers as the basis for discussion with the tutor. Offered to meet specific program needs.

EURR 5901 [0.5 credit] (formerly 55.591)
Tutorial in Russian-Area Studies

EURR 5902 [0.5 credit] (formerly 55.592)
Tutorial in Russian-Area Studies

EURR 5903 [0.5 credit] (formerly 55.593)
Tutorial in Central and East European Studies
A course of directed readings on selected aspects of Eastern and Central Europe, involving preparation of papers as the basis for discussions with the tutor. Offered to meet specific program needs.

EURR 5904 [0.5 credit] (formerly 55.594)
Tutorial in Central and East European and Russian-Area Studies

EURR 5905 [0.5 credit] (formerly 55.595)
Tutorial in Central/East European and Russian-Area Studies

EURR 5906 [1.0 credit] (formerly 55.596)
Tutorial in Central/East European and Russian-Area Studies

EURR 5908 [1.0 credit] (formerly 55.598)
Research Essay
A research essay on some topic relating to Central/East European and Russian-Area Studies

EURR 5909 [2.0 credits] (formerly 55.599)
M.A. Thesis
Other courses may be available at the University of Ottawa.

Film Studies

St. Patrick's Building 423
Telephone: (613) 520-2342
Fax: (613) 520-3575
E-mail: filmgrad@carleton.ca
Web site: www.carleton.ca/artandculture/
film_studies.html

The School

Director, Bryan Gillingham

Supervisor of Graduate Studies, Zuzana Pick

The School for Studies in Art and Culture offers a program of study and research leading to the degree of Master of Arts in Film Studies. This is a disciplinary M.A. with emphasis upon 1) the conceptual issues current in the field, and 2) the problematics of various national cinemas and other practices

The program will develop in students a broadly based expertise in the discipline. The study of Canadian cinema is given a high priority, but provision is also made for the study of other national cinemas, as well as for the study of other traditions outside the mainstream, such as women's cinemas, post-colonial cinemas, and minority and regional practices.

Most work in the program is on the feature fiction film and its institutional foundations as an object of study. However, in line with the expertise of members of faculty, the study of other film forms like documentary, animation, experimental film and video is a necessary part of the course offerings.

Questions of critical and historical method and problems of theory inform all of the courses in the program. This conceptual emphasis is in line with the central developments in Film Studies as a discipline over the past twenty-five years.

Qualifying-Year Program

Applicants who lack an Honours degree, but who have a 3 year degree in Film Studies or a related discipline with a minimum standing of B+, may be admitted to a qualifying-year program. Students who complete the qualifying-year requirements with high honours standing or better will be considered for admission to the master's program. The regulations governing the qualifying-year are outlined in the General Regulations section of this calendar.

Master of Arts

Admission Requirements

The minimum requirement for admission to the Master's program in either a full-time or part-time capacity is a B.A. (Honours) or the equivalent in Film Studies or a related discipline with high honours standing. Related disciplines might include Mass Communication, Art History, Literature, Canadian Studies, Women's Studies, and History. Applicants without a background in Film Studies may be required to take a maximum of two full credits from designated courses in the undergraduate Film Studies program in addition to their normal M.A. program requirements.

Program Requirements

The specific program requirements for students in the M.A. program are as follows:

- 1.0 core credit required
- 2.0 additional credits
- Thesis (equivalent to 2.0 credits)
- Total of 5.0 credits required

In choosing the two additional credits beyond the core seminar and the thesis, students may take 0.5 credit outside the Film Studies program subject to the approval of the Graduate Supervisor.

Because of the strong conceptual demands of the program and the expectation that students be able to synthesize ideas in a substantial piece of written work, the research essay option will not be available in partial fulfillment of the requirements of the degree.

Deadlines

Normally, full-time students should complete their course work by the end of the second term, and part-time students by the end of the fifth term.

Thesis Proposal

Students normally will submit a detailed thesis proposal to the thesis proposal committee no later than March 1 of the first year of registration for students enrolled full-time and no later than the middle of the fifth term of registration for students enrolled part-time.

Language Requirements

A reading knowledge of French (or another language approved by the Film Studies Graduate Supervisor) is required.

Academic Standing

A standing of B- or better must be obtained in each course counted towards the master's degree.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

FILM 5000 [1.0 credit] (formerly 19.500)
Directions in Film Theory and Film History
This course is intended to acquaint students with recent developments in film theory and history. Topics may include spectatorship, identity, gender, cultural studies, fan cultures, performance, reception theory, formation of taste, discourse analysis, historical method, and concepts of national and transnational cinemas.

FILM 5001 [0.5 credit] (formerly 19.501)
Directed Readings and Research
Tutorials designed to permit students to pursue research on topics in Film Studies which have been chosen in consultation with members of faculty.

FILM 5002 [0.5 credit] (formerly 19.502)
Special Topics
This course offers selected topics in film studies not available in the regular course program.

FILM 5105 [0.5 credit] (formerly 19.515)
Changing Practices
This course looks at traditional and recent developments in non-feature film forms such as documentary, newsreel, experimental film, video and television. The aesthetic particulars that distinguish these forms from the fiction feature film are examined, along with their social and cultural roles.

FILM 5201 [0.5 credit] (formerly 19.521)
Topics in European Cinema
Some aspect of European cinema - a particular period, movement, style, genre, narrative development or co-production practice - is the focus of this course. Emphasis will be upon the problematic concept of a national cinema in the light of current debates about nation-ness.

FILM 5202 [0.5 credit] (formerly 19.522)
Cinemas of the America
This course examines one or more of the cinemas of the United States, the Caribbean, Latin America and Brazil. A particular period, movement, style, genre, narrative development, some relationship between these cinemas or the problematic concept of a national cinema may be dealt with.

FILM 5204 [0.5 credit] (formerly 19.524)
Cultural Mediations
This course examines the processes of mediation that operate between mainstream and alternative, independent or marginal film industries and practices.

FILM 5208 [0.5 credit] (formerly 19.528)
Historical Traditions in Canadian Cinema
Selected aspects of the history of cinema in Canada are the focus of this course. Emphasis is placed upon the role that institutional bodies, government policies, economic decisions, aesthetic traditions, and related cultural practices have had on the history of Canadian cinema.

FILM 5209 [0.5 credit] (formerly 19.529)
Critical Perspectives on Canadian Cinema
This course examines current critical approaches to Canadian film. Attention will be given to the influence of Canadian and foreign cultural theory and criticism on film studies in Canada.

FILM 5401 [0.5 credit] (formerly 19.541)
Studies in Authorship
This course offers detailed attention to the work of one or two filmmakers, with a concern for recent ideas about the concept of authorship and the formation of artistic and critical reputations.

FILM 5500 [0.5 credit] (formerly 19.550)
Advanced Film Analysis
This course examines issues and approaches to the detailed analysis of particular film texts. Work in narratology, hermeneutics, discourse analysis, psychoanalysis, deconstruction and semiotics will provide the methodological background to the study of individual films.

FILM 5501 [0.5 credit] (formerly 19.551)
Gender and Cinema
The social production and reproduction of gender and gender relations through the cinema and its representations are examined in this course. The consequences of this work for feminist, gay and lesbian film practices and politics form an important part of the course.

FILM 5601 [0.5 credit] (formerly 19.561)
Studies in Genre
The theory and practice of film genres will be the object of study in this course.

FILM 5701 [0.5 credit] (formerly 19.571)
Topics in Animation
Institutional histories, the work of individual animators, modes of production, and the social function of animation represent topics to be covered by this course.

FILM 5900 [0.5 credit] (formerly 19.590)
Cinema and Modernism
This course examines cinema's relationship to the history and theory of modernism. The concerns of classical film theory, the emergence

of avant-garde, modernist film practices, and film's relationship to other twentieth-century art forms represent areas of study in this course.

FILM 5901 [0.5 credit] (formerly 19.591)
Cinema and the Postmodern
An examination of cinema's relationship to the history and theory of postmodern cultural practices in performance art, video, multimedia, architecture, literature, music, and other examples of artistic postmodernism is the focus of this course.

FILM 5909 (formerly 19.599)
M.A. Thesis

French

Dunton Tower 1602
Telephone: (613) 520-2168
E-mail: french@carleton.ca

The Department

Chair of the Department, J.-J. Van Vlasselaer

Departmental Supervisor of Graduate Studies, To be announced

The program of studies leading to a Master of Arts degree in French offers to the student the opportunity to specialize in one of the following areas: linguistics, literature or translation. The availability of a variety of courses and the existence of FREN 5800, FREN 5907, FREN 5908, and FREN 5909, in which the student establishes course content in consultation with his/her adviser, allow for considerable flexibility and choice in wide ranging or highly specialized studies.

Qualifying-Year Program

Applicants who hold a general (3-year) bachelor's degree with at least B standing or higher, with a major in French, are required to register in the qualifying-year program (normally 5.0 credits in French chosen from those numbered at the 4000-level), and maintain at least B+ standing overall, before proceeding to the M.A. program.

Qualifying-year students should consult the Undergraduate Calendar for a listing of 4000-level courses.

Master of Arts

Admission Requirements

The normal requirement for admission into the master's program is a B.A.(Honours) in French with at least high honours standing (normally B+ or better in Honours subject; B- or better overall).

Program Requirements

Students establish their programs in consultation with an adviser from the Department who will normally be the Supervisor of Graduate Studies or the professor with whom they take FREN 5907, FREN 5908, or FREN 5909.

The following three options are available:

- 4.0 credits of which at least 3.0 credits must be chosen from courses at the 5000-level; and an oral and written examination (Comprehensive) equivalent to 1.0 credit, in which the student demonstrates a good grasp of the tools and methods of scholarship, as well as competence in three chosen specialized areas,

- 4.0 credits of which at least 3.0 credits must be chosen from courses at the 5000-level; and a Research Essay equivalent to 1.0 credit (FREN 5908), with an oral examination,

- 3.0 credits of which at least 2.0 credits must be chosen from courses at the 5000-level; and a master's thesis equivalent to 2.0 credits (FREN 5909), with an oral examination.

With the approval of the supervisor of graduate studies, M.A. students in French may select the equivalent of 1.0 credit at the graduate or senior undergraduate level outside the 5000-level courses offered by the Department.

Guidelines for Completion of Master's Degree

Normally, all full-time students are expected to fulfil the requirements of the M.A. program by the end of the fifth term of study. Generally, students should be able to complete their program within four terms.

Students are required to file with the Department of French a detailed proposal of their thesis, research essay or comprehensive exam. Full-time master's candidates are required to submit this proposal by the end of the ninth month of full-time registration.

Academic Standing

A grade of B- or better must be obtained in each credit counted towards the master's degree.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

The graduate courses offered by the Department are open to students in the M.A. program and, with permission of the Department, to students in the qualifying-year program. For prerequisites, please consult the Department.

FREN 5001 [1.0 credit] (formerly 20.501)
Théories linguistiques françaises
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Méthodes d'analyse de la communication interculturelle. Introduction aux méthodes linguistiques permettant d'étudier la communication interculturelle. Examen des contacts entre peuples francophones et non-francophones dans le monde et des problèmes qui en résultent. Initiation à l'analyse des pratiques communicatives de gens de langue et de culture différentes.

FREN 5002 [1.0 credit] (formerly 20.502)
Linguistique du français I
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Les français créoles. Il existe en Francophonie un 'type' de français qualifié de "créole," parlé en Amérique, et aussi dans l'Océan Indien. Signification de ce qualificatif de "créole" et étude sociale et linguistique de ces variétés de français.

FREN 5003 [0.5 credit] (formerly 20.503)
Linguistique du français II
Le contenu précis de ce cours varie selon les années.

FREN 5004 [0.5 credit] (formerly 20.504)
Linguistique du français canadien
Le contenu précis de ce cours varie selon les années.

FREN 5006 [0.5 credit] (formerly 20.506)
Linguistique du français langue seconde
Le contenu précis de ce cours varie selon les années.

FREN 5007 [0.5 credit] (formerly 20.507)
Traduction: théorie et pratique
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Poésies et traduction. Après une introduction théorique de la traduction poétique, seront considérés deux problèmes particuliers: l'idéologie en traduction (traduction féministe, etc.) et le "vieillissement" des traductions (exemples de traductions de Shakespeare et de Victor Hugo depuis les premières jusqu'à nos jours).

FREN 5200 [0.5 credit] (formerly 20.520)
Aspect linguistique particulier
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Linguistique contrastive. Analyse, à la lumière de la linguistique, des principales différences grammaticales entre le français et l'anglais. Langue parlée et langue écrite. Étude de corpus parallèles et de traductions.

FREN 5401 [0.5 credit] (formerly 20.541)
Sémiotique littéraire
Le contenu précis de ce cours varie selon les années.

FREN 5402 [0.5 credit] (formerly 20.542)
Littérature et rhétorique
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: La rhétorique du roman réaliste-naturaliste: Flaubert et Zola. Le réalisme métonymique et le discours naturaliste "scientifique". On lira: Flaubert, *Madame Bovary*, *Trois Contes*; Zola, *Germinal, l'Argent*.

FREN 5403 [0.5 credit] (formerly 20.543)
Littérature et idéologie
Le contenu précis de ce cours varie selon les années.

FREN 5404 [0.5 credit] (formerly 20.544)
Auteurs I
Le contenu précis de ce cours varie selon les années.

FREN 5405 [0.5 credit] (formerly 20.545)
Thèmes, écoles, mouvements
Topic may vary from year to year.

FREN 5406 [0.5 credit] (formerly 20.546)
Genres I
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: La représentation de soi en littérature et au cinéma. Ce cours examinera la représentation de soi tel que permise par la littérature et le cinéma, en comparant un certain nombre de textes autobiographiques ou autoréflexifs dans les deux medias.

FREN 5407 [0.5 credit] (formerly 20.547)
Genres II
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Théâtre et métissage: regards sur les nouveaux théâtres du Québec. Une analyse des pratiques textuelles et scéniques de Robert Lepage, de Wajdi Mouawad, de Gilles Maheu et de Denis Marleau nous permettra de mieux comprendre les stratégies créatrices de ces artistes de la scène.

FREN 5408 [0.5 credit] (formerly 20.548)
Littérature française I
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Le roman français contemporain. Réflexion sur la forme romanesque, écriture, structure, thèmes par l'étude de cinq romans publiés au cours des vingt dernières années. On entend beaucoup dire ces temps-ci qu'il n'y a plus d'écrivains en France. Ce cours tentera de questionner ce mythe.

FREN 5409 [0.5 credit] (formerly 20.549)
Littérature francaise II
Le contenu précis de ce cours varie selon les années.

FREN 5500 [0.5 credit] (formerly 20.550)
Littérature canadienne-française I
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Cinéma et littérature québécoise. Études de romans et de pièces de théâtre québécois et de leurs versions cinématographiques: *Marie Chapdelaine*, *Le Survenant*, *Bonheur d'Occasion*, *Tit-Coq*, *Agaguk*, *Une saison dans la vie d'Emmanuel*, *La Sagouine*, *Kamouraska*, *Héloïse*, *Il était une fois dans l'est*, *Bonjour là bonjour*.

FREN 5501 [0.5 credit] (formerly 20.551)
Littérature canadienne-française II
Le contenu précis de ce cours varie selon les années.

FREN 5601 [0.5 credit] (formerly 20.561)
Sémiotique culturelle
Le contenu précis de ce cours varie selon les années.

FREN 5602 [0.5 credit] (formerly 20.562)
Littérature, société, communication
Le contenu précis de ce cours varie selon les années.

FREN 5603 [0.5 credit] (formerly 20.563)
Littérature et les autres arts
Le contenu précis de ce cours varie selon les années.

FREN 5604 [0.5 credit] (formerly 20.564)
Paralittératures
Le contenu précis de ce cours varie selon les années.

FREN 5700 [0.5 credit] (formerly 20.570)
Aspect littéraire culturel particulier
Le contenu précis de ce cours varie selon les années. Sujet pour 2002-2003: Informatique et littérature. Historique. La statistique littéraire (fréquences et probabilités). Les listes, index et concordances. L'interrogation des textes en continu (les CD ROM). Les hypertextes.

FREN 5800 [0.5 credit] (formerly 20.580)
Cours de lectures dirigées
Sujet établi sur proposition de l'étudiant en consultation avec son conseiller.

FREN 5907 [1.0 credit] (formerly 20.597)
Comprehensive Examination

FREN 5908 [1.0 credit] (formerly 20.598)
Mémoire de recherche
Tout(e) étudiant(e) qui ne fait pas de thèse, choisira un directeur d'études avec qui il/elle préparera un mémoire d'une cinquantaine de pages sur un sujet de son choix. Ce travail sera sanctionné par un examen oral.

FREN 5909 [2.0 credits] (formerly 20.599)
M.A. Thesis

Geography

Loeb Building B349
Telephone: (613) 520-2561
Fax: (613) 520-4301
E-mail: hazel_anderson@carleton.ca
Web site: www.carleton.ca/geography

The Department

Chair of the Department, Simon Dalby

Departmental Supervisor of Graduate Studies, D.R. Fraser Taylor

The Department of Geography and Environmental Studies offers programs of study and research in human and physical geography leading to the degrees of Master of Arts and Doctor of Philosophy.

The Department believes that the greatest strength of geography, as a discipline, lies in its ability to integrate and apply knowledge across its broad spectrum. The structure of the Ph.D. program expresses this philosophy. Masters students may follow this approach or pursue studies in a thematic sub-field of the discipline.

Students are accepted into the graduate program based on the standard of previous academic work, research interests, letters of reference, and the availability of faculty to act as supervisors. Each student's program of study, as far as possible, is based on the interests of the individual, although certain courses may be required. An advisory committee, consisting of the student's research supervisor and at least one (Masters) or two (Ph.D.) other member of the faculty, is established to monitor progress and provide thesis research guidance.

Excellent research laboratory facilities exist for the study of near surface processes, and the physics, chemistry, and thermodynamics of earth materials, as well as for geomatics (computer cartography, GIS and for remote sensing). These facilities are supported by a highly qualified full-time staff in laboratory instrumentation, cartography, and computing. The Maps, Data and Government Information Centre in the MacOdrum Library houses an extensive collection of cartographic resources, including imagery and digital products. The university's location in Canada's capital city offers students access to important federal resources, such as the National Library, the Public Archives of Canada, the Canada Centre for Remote Sensing, Statistics Canada, and the specialist libraries of many government departments.

Systematic interests of Departmental members are applied to a variety of world regions, although emphasis is given to Canada (including northern studies) and the Third World. Individual faculty research interests are posted on our Web site www.carleton.ca/geography. The interacting and

overlapping clusters of research specialization within the Department are the following:

Physical Geography
Studies of natural and anthropogenic processes close to the earth's surface and their geotechnical significance; climate-ground interaction; geocryology; soils and sediments; vegetation structure and health; biogeography; Quaternary studies; karst.

Resource Development
Identification and analysis of development processes; the interplay of environmental, demographic, social, gender, political, and economic variables in the spatial development of land resources, settlement systems, and natural resource-based industries; environmental impact assessment and environmental management. Canadian and Third World development are stressed.

Cultural, Historical, and Political Geography
Rural and urban settlement history; ethnicity; territorial organization and the concepts of state, group politico-territorial identities, territoriality, and self-determination; role of territory in conflict situations; perceptions of environment and geographies of the mind; gender as a cultural variable; urban heritage conservation.

Social and Economic Geography
Geographical analyses of the social and economic organization of societies; area variations in social well-being; medical geography; provision of public and informal services in changing local and regional environments; implications of gender roles; industrial systems; philosophy of science and of geography.

Geomatics
Development of applications in computer cartography and the use of remote sensing in geographical research.

Qualifying-Year Program
Applicants with exceptional promise who have a general (3-year) bachelor's degree, or who have substantially less than the Honours B.A. in Geography, may be admitted to a qualifying-year program. To be considered for admission into the master's program, qualifying-year students must attain at least overall high honours standing in their qualifying-year geography courses. See the General Regulations section of this Calendar for details about the the qualifying year.

Master of Arts

Admission Requirements

The normal requirement for admission into the master's program is a B.A.(Honours) or B.Sc.

(Honours) in Geography or a related discipline, with at least high honours standing. In exceptional cases, pertinent work experience may be considered in support of an application to the Department. Students entering the program from other disciplines or with academic deficiencies may be required to take additional courses.

Program Requirements

The M.A. in Geography should normally take from twelve to eighteen months, but fieldwork may necessitate some extension. The specific program requirements of the Department of Geography and Environmental Studies are:

5.0 credits, which must include:

- One of GEOG 5000 or GEOG 5001
- M.A. thesis (2.5 credits) which must be defended at an oral examination
- GEOG 5905 – Masters Research Workshop
- 1.5 other Credits
- All students are required to have a reading knowledge of the language considered essential to their research.

In addition to the formal requirements, M.A. students will normally be required to attend the Departmental Seminar series, and the Graduate Field Camp.

Doctor of Philosophy

The doctoral program in geography is structured around two fields:

- the geography of societal change with emphasis on the global political economy; restructuring and the environment; geographies of socio-cultural evaluation; feminist geographies
- the geography of environmental change with emphasis on environmental processes and anthropogenic impacts; appraisal and societal management of environmental resources

Students in each field are required to complete GEOG 6000/GEOG 6001, which addresses substantive and methodological issues arising out of the interactions of social and environmental systems. Every student's thesis committee will include at least one faculty member from the field other than the chosen field.

Admission Requirements

The normal requirement for admission to the Ph.D. program is a master's degree (or the equivalent) in geography, with at least an A- average. A student already registered in the

M.A. program who shows outstanding academic performance and research promise may be permitted to transfer to the Ph.D. program with a recommendation by the Departmental graduate committee.

Applicants whose academic preparation has deficiencies in certain areas may be admitted to the Ph.D. program with the requirement that they complete additional course work.

Admission to the Ph.D. program is granted on a full-time basis in September for the fall term. In exceptional cases, a part-time program may be considered.

Program Requirements

Program requirements for the Ph.D. degree are outlined in the General Regulations section of this Calendar. The specific program requirements of the Department of Geography and Environmental Studies are:

- 10.0 credits
- GEOG 6000/GEOG 6001
- Either GEOG 6003/GEOG 6004 or GEOG 6006/GEOG 6007
- Two written comprehensive examinations including GEOG 6905 and either GEOG 6906 or GEOG 6907
- Presentation and oral defence of the thesis proposal as outlined below
- Language requirement as outlined below
- A thesis equivalent to 8.0 of the required 10.0 credits which must be defended at an oral examination

Comprehensive Examinations

Each doctoral candidate is required to write two comprehensive examinations:

- GEOG 6905
- GEOG 6906 or 6907, according to the chosen field of specialization

The comprehensive examinations must be completed after course requirements for the Ph.D. have been completed. The examinations will normally occur no later than the winter term of second year of registration in the Ph.D. program. Failure to complete the examinations successfully will result in denial of permission to continue in the program.

Thesis Proposal

Candidates normally register in the thesis on entry to the program and work actively to define their research topic during the first term of registration. The thesis proposal is normally presented after comprehensive requirements

have been fulfilled. Candidates normally submit and defend the thesis proposal at an oral examination no later than the end of the winter term of the second year of registration in the Ph.D. program. Continuous registration is required after initial registration in the thesis.

Language Requirement

All Ph.D. candidates must demonstrate an ability to comprehend geographical literature in a language other than English, where required by the thesis committee.

Residence Requirements

All Ph.D. candidates must be registered full time in a minimum of six terms to satisfy the residence requirement.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

In addition to the selection of courses offered by the Department, graduate students in geography are encouraged to consider, in partial fulfillment of their degree requirements, appropriate courses offered in such disciplines as biology, chemistry, economics, engineering, geology, history, international affairs, physics, political science, and sociology.

Courses at the University of Ottawa may also be taken for credit in a Carleton M.A. program; permission of the Departments in both universities is required.

GEOG 5000 [0.5 credit] (formerly 45.500)
Approaches to Geographical Inquiry
A review of the major philosophical perspectives shaping research and explanation by geographers. Particular attention is paid to interpretations of social structure and human action, the nature of the biophysical universe, and the interaction between human beings and their environments.

GEOG 5001 [0.5 credit] (formerly 45.501)
Modeling Environmental Systems
Methods and problems of research on the physical environment, with illustrative material taken from the atmospheric and surface earth sciences. Issues such as the identification and behaviour of environmental systems, temporal and spatial scale, experimental method under field conditions, and simulation and model development are considered.

GEOG 5003 [0.5 credit]
Theory and Method in Qualitative Geographical Research
Development of critical research skills through: an analysis of the relationship between power and knowledge and the processes of social differentiation (gender, class, race); examination of qualitative research methods including participant observation, personal narratives, interviewing, and 'participatory research'.

GEOG 5005 [0.5 credit] (formerly 45.505)
Global Environmental Change: Human Implications
Global environmental change: its significance for societies, economies and international relations. Value systems underlying environmental discourse; political economy of the environment; sustainability and security. Environmental diplomacy and grassroots environmentalism. Regionalized impacts of pressures on natural environments; challenges of adaptation. (Also listed as INAF 5701.)

GEOG 5107 [0.5 credit] (formerly 45.517)
Field Study and Methodological Research
Field acquisition and analysis of geographic material; supervised field observations and methodology. (Individual or group basis, by special arrangement.)

GEOG 5200 [0.5 credit] (formerly 45.520)
Issues in Development in Africa
Analysis of structures and processes of political, social, and economic change in intertropical Africa at scales ranging from the intrahousehold and local community to the state and international system. An objective is to integrate gender and the environment into analyses which draw on theories of political economy. (Also listed as INAF 5603.)

GEOG 5303 [0.5 credit] (formerly 45.533)
Geocryology
Development of ground ice in permafrost regions of Canada; ice segregation and pore-water expulsion during ground freezing; analytical and numerical approaches to modeling permafrost conditions.
Prerequisite: GEOG 4108 or permission of the Department.

GEOG 5307 [0.5 credit] (formerly 45.537)
Soil Resources
Physical, mineralogical, chemical, and other properties of soils will be studied in agricultural, environmental, geomorphological and/or geotechnical contexts, as relevant to the students enrolled.

GEOG 5400 [0.5 credit] (formerly 45.540)
Territory and Territoriality
Contemporary geographical and international relations theorizing is challenging notions of boundaries and territories in the political organization of modernity. Using contemporary writings on geopolitics, security, sovereignty, self-determination and identity politics this course investigates territoriality as a political and intellectual strategy. (Also listed as INAF 5402.)

GEOG 5405 [0.5 credit] (formerly 45.545)
Problems in Historical Geography
Philosophical and methodological approaches in geography, history, and historical geography, emphasizing the use of primary documents, model building, and statistical methods as they relate to the historical geography of Canada. Also offered at the undergraduate level, with different requirements, as GEOG 4305, for which additional credit is precluded.

GEOG 5500 [0.5 credit] (formerly 45.550)
Globalization and Localities
A review of recent theoretical and methodological debate in this field and analysis of the changing geography of production, employment, and social consumption in advanced economies. Policy issues will be considered. Also offered at the undergraduate level, with different requirements, as GEOG 4401, for which additional credit is precluded.

GEOG 5508 [0.5 credit] (formerly 45.558)
Agribusiness North and South
Analysis of the transformation of agriculture into an integrated multi-sectoral food production system and of its theoretical implications. Focus on the growth and strategies of agribusiness institutions in advanced industrial societies and on their penetration into, and impact upon, Third World economies. (Also listed as INAF 5304.)

GEOG 5700 [0.5 credit] (formerly 45.570)
Sustainability and Development in the Circumpolar North
The Circumpolar Arctic Region is undergoing rapid political, economic, social and technological development, which impacts sustainability. Climate, contaminants and biological diversity focus international attention, Nunavut, the Russian North, major developments, and international circumpolar regime formation will be discussed, with significant emphasis on environment and development.

GEOG 5703 [0.5 credit] (formerly 45.573)
Natural and Regional Resource Analysis
A review and critical appraisal of selected methods for natural and regional resource analysis such as plan evaluation methods, input-output models, resource optimization models, natural resource accounting, and ecological economics.

GEOG 5800 [0.5 credit] (formerly 45.580)
Spatial Information Systems
Spatial Data Infrastructures, Cybercartography and Visualization. The policy and technical issues involved with the creation of spatial data infrastructures including cybercartography and cartographic visualization. Advanced concepts and problems involved with spatial information systems, especially those with a mapping component.

GEOG 5803 [0.5 credit] (formerly 45.583)
Remote Sensing and Image Analysis
Advanced sensors and calibration; analysis of atmospheric, topographic and bi-directional reflectance effects; spectral, spatial and temporal image analysis; non-parametric classification; physical modeling; project and laboratories in student's application field.

GEOG 5804 [0.5 credit] (formerly 45.584)
Geographic Information Systems
GIS for students with no previous experience. Includes data formats and structures, input/output and analysis capabilities, and GIS applications.

GEOG 5900 [0.5 credit] (formerly 45.590)
Graduate Tutorial
Tutorial, directed reading or research, offered on an individual basis, to meet specific program needs; may be taken in one of the areas of specialization of the Department.

GEOG 5905 [0.5 credit]
Masters Research Workshop
A workshop which focuses on the challenges of research design in the various sub-fields of geography. The workshop will culminate with the development and defence of a thesis research proposal.

GEOG 5909 [2.5 credits] (formerly 45.599)
M.A. Thesis
Thesis supervision will be given in all areas of specialization of the Department, as listed in the introductory section of this department's program description.

• 6000-level courses are open only to students registered in the doctoral program.

GEOG 6000 [0.5 credit], GEOG 6001 [0.5 credit] (formerly 45.600, 45.601)
Doctoral Core Seminar: Geography, Society and the Environment
Geographical perspectives on the development of society/environment interrelations in Western thought and critiques thereof. The course is taught by faculty representing the two fields of the program, the geography of social change and the geography of environmental change.

GEOG 6003 [0.5 credit], GEOG 6004 [0.5 credit] (formerly 45.603, 45.604)
Field Seminar: Geography of Societal Change
Analysis of current geographical and related research into the three themes of global political

economy: restructuring and the environment; geographies of socio-cultural evaluation; and feminist geographies.

GEOG 6006 [0.5 credit], GEOG 6007 [0.5 credit] (formerly 45.606, 45.607)
Field Seminar: Geography of Environmental Change
Analysis of geographical and related research into the appraisal and societal management of environmental resources, and environmental processes and anthropogenic impacts.

GEOG 6905 (0.0 credit) (formerly 45.695)
Comprehensive Examination: Geography, Society and the Environment
This examination involves a general knowledge of geographical perspectives on the development of society/environment interrelations in Western thought and critiques thereof. A specific theme will be identified for each candidate. Evaluation is: Pass, Pass with Distinction, Fail.

GEOG 6906 [0.0 credit] (formerly 45.696)
Comprehensive Examination: The Geography of Societal Change
This examination focuses on research challenges in theory and methodology in the themes of global political economy: restructuring and the environment; geographies of socio-cultural evaluation; feminist geographies. A specific theme will be identified for each candidate. Evaluation is: Pass, Pass with Distinction, Fail.

GEOG 6907 [0.0 credit] (formerly 45.697)
Comprehensive Examination: The Geography of Environmental Change
This examination focuses on research challenges in theory and methodology associated with the appraisal and societal management of environmental resources, and environmental processes and anthropogenic impacts. A specific theme will be identified for each candidate. Evaluation is: Pass, Pass with Distinction, Fail.

GEOG 6909 [8.0 credits] (formerly 45.699)
Ph.D. Thesis

The Ottawa-Carleton Geoscience Centre

Université d'Ottawa
University of Ottawa
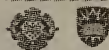
Carleton University

2240 Herzberg Building
Telephone: (613) 520-3515
Fax: (613) 520-5613
E-mail: earth_sciences@carleton.ca
Web site: www.earthsci.carleton.ca/ocgc

The Centre

Director of the Centre, John Blenkinsop

Established in 1982, the Ottawa-Carleton Geoscience Centre, a joint initiative of Carleton University and the University of Ottawa, offers programs leading to the degrees of M.Sc. and Ph.D. in most areas of geoscience. The Centre houses modern instrumental facilities, and research activity includes most areas of the Earth Sciences.

The size of the Centre and its location in the nation's capital offer unique opportunities for collaborative research over a broad range of disciplines. Of particular note is the Centre's close collaboration with the Geological Survey of Canada. The campuses are fifteen minutes apart by complimentary inter-university transport and within a short distance of most federal facilities.

Graduate students are enrolled in the university where their faculty supervisors hold appointments. Students draw from a program of courses in English or French and may pursue their research in either language.

Applications for graduate admission are made to the Director of the Centre.

The research interests of members of the Centre are listed below.

Members of the Centre

The home department of each member is indicated by (CU) for the Department of Earth Sciences, Carleton University; (UO) for the Department of Earth Sciences, University of Ottawa; (CE) for the Department of Civil Engineering, Carleton University; (PHY) for the Department of Physics, University of Ottawa; (GEOGCU) for the Department of Geography and Environmental Studies at Carleton University; (GEOGUO) for the Department of Geography at the University of Ottawa.

- F.P. Agterberg, *Geomathematics, Evaluation of Non-renewable Resources, Automated Stratigraphic Correlation* (UO-Adjunct)

- R.W. Arnott, *Clastic Sedimentology, Experimental Sedimentology* (UO)

- I. Asudeh, *Seismology and Instrumentation* (CU-Adjunct)

- G.M. Atkinson, *Engineering Seismology, Strong Ground Motion, Seismic Hazard* (CU)

- A. Bannari, *Remote Sensing and Geographic Information Systems* (GEOGUO)

- G.E. Bauer, *Geotechnical Engineering, Groundwater Flow, Soil Mechanics* (CE)

- Keith Bell, *Isotope Studies, Petrology of Alkaline Rocks and Carbonatites, Geochronology* (CU)

- Keith Benn, *Structural Geology, Structural Petrology, Anisotropy of Magnetic Susceptibility, Basement Tectonics* (UO)

- R.G. Berman, *Metamorphic Petrology, Experimental Petrology* (CU-Adjunct)

- John Blenkinsop, *Mass Spectrometry, Geochronology, Isotope Geochemistry* (CU)

- G.F. Bonham-Carter, *Spatial Information Systems, Spatial Data Modeling* (UO-Adjunct)

- R.L. Brown, *Tectonics and Structural Geology* (CU)

- C.R. Burn, *Permafrost and Ground Ice, Yukon and Western Arctic* (GEOGCU)

- E.M. Cameron, *Precambrian Geochemistry, Genesis of Gold Deposits, Exploration Geochemistry* (UO-Adjunct)

- S.D. Carr, *Cordilleran and Grenville Tectonics, U-Pb Geochronology* (CU)

- I.D. Clark, *Hydrogeology, Environmental Isotope Geochemistry* (UO)

- B.L. Cousens, *Igneous Petrology; Isotope Geochemistry* (CU-Adjunct)

- S.L. Cumbaa, *Vertebrate Paleontology and Paleoecology* (CU-Adjunct)

- W.J. Davis, *U-Pb geochronology, isotope geochemistry; Precambrian Lithospheric evolution* (CU-Adjunct)

- André Desrochers, *Carbonate Sedimentology and Diagenesis, Canadian Arctic* (UO)

- M. D'Iorio, *Remote Sensing; Radar Geology; Geostatics* (UO-Adjunct)

- G.R. Dix, *Sedimentology and Stratigraphy, Emphasis on Modern and Ancient Carbonate Settings* (CU)

- O.A. Dixon, *Invertebrate Paleontology, Stratigraphy, Canadian Arctic* (UO-Adjunct)

- J.A. Donaldson, *Precambrian Stratigraphy and Sedimentology* (CU-Adjunct)

- R.M. Easton, *Grenville and Proterozoic Geology, Physical Volcanology, Geochemistry* (CU-Adjunct)

- J. Eberle, *Vertebrate Paleontology* (CU-Adjunct)

- Danielle Fortin, *Geomicrobiology; Environmental Geochemistry* (OU)

- A.D. Fowler, *Geochemistry, Archean Metavolcanic Belts, Non-linear Dynamics* (UO)

- H.M. French, *Permafrost and Periglacial Phenomena* (UO)

- William K. Fyson, *Structural Analyses in Metamorphic Terrains* (OU-Adjunct)

- Konrad Gajewski, *Climatology and Climatic Changes: Quaternary Paleoecology* (GEOGUO)

- Marie-Anne Geurts, *Palynology and Geomorphology, Travertine* (GEOGUO)

- H.J. Gibson, *Subaqueous Volcanic Processes and Metallic Mineral Deposits* (CU-Adjunct)

- W.D. Goodfellow, *Geochemistry of Modern and Ancient Sediment-hosted Deposits, Mass Extinction* (UO-Adjunct)

- M.D. Hannington, *Economic Geology, Mineral Deposits* (CU-Adjunct)

- K.H. Hattori, *Isotope Geochemistry, Mineral Deposits, Archean Geology* (UO)

- Donald D. Hogarth, *Mineralogy; Igneous and Metamorphic Petrology; Alkalic Rocks* (OU-Adjunct)

- P.G. Johnson, *Glacial Geomorphology, Slope Mass Movements, Glacier Hydrology* (GEOGUO)

- A.G. Jones, *Magnetotellurics* (CU-Adjunct)

- D.J. King, *Remote Sensing, Vegetation Damage Assessment including Geobotanical Techniques, Geographic Information Systems* (GEOGCU)

- Thomas Kotzer, *Environmental Isotope Geochemistry; Hydrogeology; Radioisotopes* (OU- Adjunct)

- Ralph Kretz, *Mineral Chemistry, Metamorphism, Environmental Studies* (UO-Adjunct)

- Jarmila Kukalova-Peck, *Paleontology, Fossil Insects* (CU-Adjunct)

- A.E. Lalonde, *Petrology and Mineralogy of Plutonic Rocks* (UO)

- M. Lamontagne, *Intraplate Seismicity* (CU-Adjunct)

- Bernard Lauriol, *Geomorphology* (GEOGUO)

- D.A. Leckie, *Clastic Sedimentology, Sequence Stratigraphy, Basin Analysis* (CU-Adjunct)

- A.G. Lewkowicz, *Permafrost Geomorphology, Hydrogeology, Effect of Global Change on Arctic Terrain* (GEOGUO)

- Yvan L'Heureux, *Non-linear Dynamics; Crystal Growth Modeling* (PHY)

- Joyce Lundberg, *Karst, Quaternary Studies, Geochronology* (GEOGCU)

- Andrew M. McDonald, *Mineral of Hyperalkaline Rocks: Crystal Chemistry; Sulfide Mineralogy* (UO-Adjunct)

- F.A. Michel, *Isotope Geochemistry, Groundwater and Permafrost Studies* (CU)

- R.T. Patterson, *Micropaleontology Specializing in Foraminifera* (CU)

- J.A. Percival, *Igneous and Metamorphic Petrology, Geochemistry, Structural Geology, Geochronology* (UO-Adjunct)

- R.H. Rainbird, *Precambrian Sedimentology and Stratigraphy* (CU-Adjunct)

- Giorgio Ranalli, *Rheology of the Earth, Geodynamics, Plate Tectonics* (CU)

- D.G. Rancourt, *Mössbauer Spectrometry, Mineralogy, Geobarometry, Geothermometry, Micas* (PHY)

- M.R. Robin, *Contaminant Hydrogeology, Geostatistics, Geomathematics* (UO)

- W.R. Roest, *Global Plate Tectonics, Potential Fields, Regional Geophysical Compilations, Continental Margin Development, Arctic Ocean and Adjacent Land Areas* (UO-Adjunct)

- C.J. Schröder-Adams, *Micropaleontology, Biostratigraphy, Paleoecology, Foraminifera, Sequence Stratigraphy* (CU)

- G.B. Skippen, *Metamorphic Petrology, Aqueous Geochemistry* (CU)

- M.W. Smith, *Permafrost, Microclimate, Soil Freezing* (GEOGCU)

- R. Stern, *U-Pb-Th Geochronology; Secondary Ion Mass Spectrometry; Trace Element Geochemistry* (CU-Adjunct)

- R.P. Taylor, *Igneous Petrology, Mineral Deposits* (CU)

- J.K. Torrance, *Soil Chemistry, Clays, Oxide Minerals and Geotechnical Problems* (GEOGCU)

- Cees van Staal, *Sedimentary and Metamorphic Terranes in Europe and North America and Tectonic Evolution of the Appalachian Orogen* (UO-Adjunct)

- Jan Veizer, *Sedimentary Geochemistry, Carbonates, Diagenesis, Ores, Precambrian Sedimentology* (UO)

- D.H. Watkinson, *Metallic Mineral Deposits* (CU)
- P.J. Williams, *Soil Freezing and Geotechnical Problems, Cold Region Pipelines* (GEOGCU-Distinguished Research Professor)

Master of Science

Admission Requirements

The normal requirement for admission to the program is an Honours B.Sc. degree, with at least high honours standing, in geology or a related discipline.

Program Requirements

- A research thesis defended at an oral examination
- The equivalent of 2.0 credits, one of which may be at the senior undergraduate level
- Public lecture on thesis results prior to the thesis examination

Academic Standing

A grade of B- or better must normally be received in each course counted towards the Master's degree.

Doctor of Philosophy

Admission Requirements

The normal requirement for admission to the Ph.D. Program is an M.Sc. degree in Earth Sciences or a related discipline.

Students who show outstanding academic performance and research promise may be permitted to transfer to the Ph.D. program. A student requesting such a transfer must first successfully complete the Ph.D. comprehensive examination and the M.Sc. course requirements.

Program Requirements

- A research thesis defended orally before an examination board which includes an external examiner
- A comprehensive examination to include presentation of a thesis proposal and three areas chosen by the student's advisory committee and approved by the Director of the Ottawa-Carleton Geoscience Centre
- A minimum of 1.0 credit at the graduate level. Additional courses may be prescribed by the thesis advisory committee
- Public lecture on thesis results prior to the thesis examination

Residence Requirement

The normal residence requirement for the Ph.D. degree is at least four terms of full-time study.

Guidelines for Completion of Master's and Doctoral Degrees

Full-time students enrolled in the 5.0 credit M.Sc. program are expected to complete the program by the end of six terms, and part-time students by the end of six years. A thesis proposal and selection of the thesis committee should be completed by the end of the second term for both Ph.D. and M.Sc. students.

Full-time students enrolled in the 10.0 credit Ph.D. program are expected to complete the program by the end of four years, and part-time students by the end of eight years, with the opportunity for extensions upon the recommendation of the supervisor and departmental supervisor of graduate studies. A comprehensive examination for Ph.D. students must be completed by the end of the first year.

Directed Studies Courses

Directed studies courses are not permitted as credit toward the graduate degree requirements. Such courses may be taken as extra to the minimum requirements for the M.Sc. or Ph.D. degrees.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers appear in parentheses after the Carleton course number and credit information.

GEOL 5001 [0.5credit] (formerly 67.501) (GEO 5101)
Seminars in Earth Sciences I
One-term modular courses covering a spectrum of Earth Science topics and current research problems, ranging from the geology and geophysics of the solid Earth, to its surface environment and crustal resources. A minimum

of four modules offered per term, three must be completed to obtain course credit. Students may not normally take a module for credit that is offered by their supervisor, but may do so with the permission of the Director. Choice of modules must be approved by the Centre Director. Course complements GEOL 5002.

GEOL 5002 [0.5credit] (formerly 67.502)
(GEO 5102)
Seminars in Earth Sciences II
One-term modular courses covering a spectrum of Earth Science topics and current research problems, ranging from the geology and geophysics of the solid Earth, to its surface environment and crustal resources. A minimum of four modules offered per term, three must be completed to obtain course credit. Students may not normally take a module for credit that is offered by their supervisor, but may do so with the permission of the Director. Choice of modules must be approved by the Centre Director. Course complements GEOL 5001.

GEOL 5104 [0.5credit] (formerly 67.514)
(GEO 5114)
Mineralogy
An advanced course covering selected topics in mineralogy, such as crystallography, crystal chemistry, crystal structure, mineralogy of rock-forming mineral groups, and instrumental methods in mineralogical research, such as use of electronic optical instruments, spectroscopy, and X-ray crystallography; seminar presentations and practical exercises included.

GEOL 5201 [0.5credit] (formerly 67.521)
(GEO 5121)
Igneous Petrogenesis
Concentration on one or more of: origin and differentiation of basaltic magma; origin of granites; computer modeling of partial melting and fractional crystallization; magmatism in time and space, physical processes in igneous petrology. Laboratory and lecture material linked together in project form. (Also listed as GEO 5721.)

GEOL 5201 [0.5credit] (formerly 67.521)
(GEO 5721)
Pétrogenèse Ignée
Un cours basé sur un (ou plusieurs) des thèmes suivants: origine et différenciation de magma basaltique; origine de granites; simulation par ordinateur de fusion partielle et cristallisation fractionnée; magmatisme en temps et en espace. Laboratoire et cours qui s'enchainent sous forme d'un projet.

GEOL 5202 [0.5credit] (formerly 67.522)
(GEO 5122)
Physical Volcanology
The distribution, classification and physical characteristics of volcanoes and other volcanic landforms; lava flows, tephra, breccias, and other rocks formed through volcanic activity. Volcanic environments; recognition of ancient volcanic features; case histories.

GEOL 5203 [0.5credit] (formerly 67.523)
(GEO 5123)
Metamorphic Petrology
Thermodynamics and kinetics of mineral reactions; metamorphic zones and isograds; mass transfer; regional and global aspects of metamorphism.

GEOL 5204 [0.5credit] (formerly 67.524)
(GEO 5124)
Mineral Deposits
Relationships of some metallic mineral deposits to igneous rocks; topics range from oxides and sulphides in and around intrusions to stratiform volcanogenic deposits. Course includes a field trip to northern Ontario and Quebec.

GEOL 5300 [0.5credit] (formerly 67.530)
(GEO 5130)
Dynamics of Sedimentary Systems
Weathering, rivers, ocean and atmosphere, sedimentation and tectonism, basins and their sediments, P-T evolution, compaction, diagenesis, brines and fluid dynamics, mineralization, rock cycle and evolution through geologic time.

GEOL 5301 [0.5credit] (formerly 67.531)
(GEO 5131)
Siliciclastic Sedimentology
Origin and significance of physical sedimentary processes and structures. Analysis of ancient siliciclastic depositional environments in a facies model and sequence stratigraphic framework. Course involves lectures, seminars and field excursions.

GEOL 5303 [0.5credit] (formerly 67.533)
(GEO 5133)
Advanced Micropaleontology
Selected topics in micropaleontology covered in greater detail than in introductory micropaleontology. Areas addressed include the paleoecology, biogeography and biology of foraminifera and other microfossil groups, as well as their application to biostratigraphy and paleo-oceanography.

GEOL 5305 [0.5credit] (formerly 67.535)
(GEO 5135)
Carbonate Sedimentology
Lectures and seminars will cover aspects of modern depositional systems, dynamic facies models, sequence stratigraphy, mineralogy, and diagenesis of carbonate sediments. The practical part of the course will consist of a field-laboratory project that integrates various techniques in carbonate sedimentology (mapping, petrography, staining, Cathodoluminescence, fluorescence, SEM)

GEOL 5306 [0.5credit] (formerly 67.536)
(GEO 5136)
Paleobiology
Selected topics in paleobiology of marine fossils. Topics include extinctions, micro- and macro-evolutionary processes, long-term trends and cycles in the Phanerozoic, and functional morphology.

GEOL 5308 [0.5credit] (formerly 67.538)
Marine Geology
Development of ocean basins, physical and chemical oceanographic processes, paleoceanographic changes of watermass distribution and circulation patterns, interaction between atmosphere and ocean, marine sedimentation, offshore seismic stratigraphy, marine habitats, marine instrumention.

GEOL 5309 [0.5credit] (formerly 67.539)
(GEO 5139)
Glacial Sedimentology
Systematic study of various glacial and glacially related sedimentary environments and processes. Significance of genesis of glacial sediments for stratigraphic correlations, mineral exploration, interpretation of environmental geochemistry, aggregate evaluation, and hydrogeology. Weekly two-hour lectures and field excursions.

GEOL 5400 [0.5credit] (formerly 67.540)
(GEO 5140)
Pleistocene Permafrost and Periglacial Environments
An examination of the stratigraphical evidence for cold, non-glacial conditions during the Pleistocene when extensive areas of mid latitude were exposed to intense frost action and permafrost. Pleistocene periglacial sediments and sedimentary structures indicative of past permafrost are considered.

GEOL 5401 [0.5credit] (formerly 67.541)
(GEO 5141)
Permafrost Hydrology and Investigative Methods
An examination of groundwater flow in permafrost regions. The importance of groundwater in the formation of various types of ground ice, and the effect of groundwater flow on permafrost distribution.

GEOL 5402 [0.5credit] (formerly 67.542)
(GEO 5142)
Environmental Geoscience
A study-seminar course in which students will examine, in depth, certain environmental problems, including geological hazards, mineral and energy consumption and environmental degradation. The relation between development and the environment will be considered. Students will prepare a report and present a seminar on a subject of their choice, and will participate in a research project centred in the Ottawa area.

GEOL 5403 [0.5credit] (formerly 67.543)
(GEO 5143)
Environmental Isotopes and Groundwater Geochemistry
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radio-carbon, and exotic radioisotopes (e.g.,36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry

and mineral solubility with emphasis on the carbonate system. Some application to paleoclimatology will be discussed.
Prerequisite: Fourth-year hydrogeology (GEOL 4200 or GEO 4192) or the equivalent.

GEOL 5404 [0.5credit] (formerly 67.544)
(GEO 5144)
Groundwater Resources
Advanced topics in the exploration and development of groundwater resources, including detailed aquifer response analysis. Examination of hydrogeology in arid and undeveloped regions will also be included.
Prerequisite: Fourth-year hydrogeology (GEOL 4200 or GEO 4192) or the equivalent.

GEOL 5406 [0.5credit] (formerly 67.546)
(GEO 5146)
Numerical Methods in Hydrogeology
Application of numerical methods in hydrogeological problem solving, including a review of governing equations, initial and boundary conditions, and both finite element and finite difference methods. Additional topics to be explored include particle tracking, Laplace and Fourier transforms, and stochastic methods.
Prerequisite: Fourth-year hydrogeology or permission of instructor.

GEOL 5407 [0.5credit] (formerly 67.547)
(GEO 5147)
Geochemistry of Natural Waters
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

GEOL 5408 [0.5credit] (formerly 67.548)
(GEO 5148)
Theory of Flow and Transport in Porous Media
Course designed for hydrogeologists and engineers who want in-depth understanding of the theory of fluid flow and solute transport through geological materials. Emphasis on porous media. Topics to be covered: types of fluids and porous media; saturated, unsaturated, and multi-phase flow; development of solute transport equations using continuum and stochastic approaches. One three-hour lecture per week, reading and problem-solving assignments plus final examination.
Prerequisites: Fourth-year hydrogeology, second-year calculus, and first-year statistics, or permission of the instructor.

GEOL 5501 [0.5credit] (formerly 67.551)
(GEO 5151)
Precambrian Geology
Problems of Precambrian geology, emphasizing classical and current studies in North America; comparative study of the Canadian Shield and other Precambrian shields; research projects, field trips and petrologic studies of representative rock suites.

GEOL 5503 [0.5credit] (formerly 67.553)
(GEO 5153)
Computer Techniques in the Earth Sciences
A practical course in the application of computer techniques in the acquisition and interpretation of geoscientific data. Topics will be selected from the following: remote sensing and geographic information systems; geostatistical analysis techniques; analysis and modeling of geoscientific data.
Prerequisites: Permission of the instructor.

GEOL 5507 [0.5credit] (formerly 67.557)
(GEO 5157)
Tectonic Processes Emphasizing Geochronology and Metamorphism
Applications of empirical, analytical and quantitative techniques to problems in regional geology and crustal tectonics; orogenic processes; heat and metamorphism; isotopic geochronology as applied to thermal history; derivation and interpretation of P-T-t paths.

GEOL 5600 [0.5credit] (formerly 67.560)
(GEO 5160)
Chemistry of the Earth
An investigation of the geochemical constitution of the Earth and how the Earth has evolved. Topics will include meteorites and the early history of the Earth; chemical and isotopic constraints on the geochemical evolution of the crust and mantle; Earth models and their limitations.

GEOL 5602 [0.5credit] (formerly 67.562)
(GEO 5162)
Physical Geochemistry
Application of thermodynamics to geologic problems. Experimental study of mineral equilibria.

GEOL 5603 [0.5credit] (formerly 67.563)
(GEO 5163)
Stable Isotope Geochemistry
Mechanisms of isotope fractionation in nature; physical and chemical isotope fractionation, kinetic isotope effects. Variation of stable isotope ratios (hydrogen, carbon, oxygen and sulphur) in nature. Preparation techniques of natural samples for isotope analysis. Applications of stable isotopes to study magma genesis, ore genesis, nature of water and formation fluids and sedimentary environments.

GEOL 5609 [0.5credit] (formerly 67.569)
(GEO 5169)
Radioisotope Geochemistry
Nucleosynthesis; chemical differentiation of the Earth. Evolution of large-scale reservoirs. Isotopic tracers ($143Nd/144Nd$, $87Sr/86Sr$, common Pb). Geochronology; fundamentals and application of Sm/Nd, Rb/Sr, U/Pb, K/Ar and Lu/Hf methods. Evolution of the solid Earth from the isotopic perspective.
Precludes additional credit for GEOL 5605 (GEO 5165) (taken before 1997-98).

GEOL 5701 [0.5credit] (formerly 67.571)
(GEO 5171)
Physics of the Earth
The physics and dynamics of the solid Earth: seismology; gravitational and magnetic fields, thermal state. Geophysical constraints on the structure and composition of the interior. Geodynamic processes.

GEOL 5702 [0.5credit] (formerly 67.572)
(GEO 5172)
Tectonophysics
The physics of deformation; continuum mechanics approach (elasticity, strength, plasticity, viscosity), and micro-rheological approach (diffusion, dislocations, and flow mechanisms). Applications to tectonic processes.

GEOL 5703 [0.5credit] (formerly 67.573)
(GEO 5173)
Structural Geology
Selected problems in structural geology treated in seminar and laboratory sessions. Emphasis on interpretation of fabrics developed during synmetamorphic strain. Students investigate and report on individual projects.

GEOL 5704 [0.5credit] (formerly 67.574)
(GEO 5174)
Tectonics
An investigation of the structural style of mountain belts and their tectonic setting; tectonics of Precambrian deformed belts.

GEOL 5707 [0.5 credit] (formerly 67.577)
(GEO 5177)
Engineering Seismology
Seismological topics with engineering applications. Characterization of seismicity and seismic sources (areas and faults). Seismic hazard analysis. Empirical and theoretical modeling of strong ground motion in time and frequency domain.

GEOL 5900 [0.5credit] (formerly 67.590)
(GEO 5190)
Directed Studies
Directed reading and/or laboratory studies for 1.0 credit course, under the guidance of selected extramural or intramural directors. A written description of the project must be submitted for departmental approval prior to registration. This course does not count for credit toward the graduate degree requirements.

GEOL 5901 [0.5credit] (formerly 67.591)
(GEO 5191)
Directed Studies
Directed reading and/or laboratory studies for 0.5 credit course, under the guidance of selected extramural or intramural directors. A written description of the project must be submitted for departmental approval prior to registration. This course does not count for credit toward the graduate degree requirements.

GEOL 5903 [0.5credit] (formerly 67.593)
(GEO 5193)
Field Studies
Systematic investigations of geological problems,
based on a minimum of fifteen days field work
plus related library research and laboratory
projects. Written report required.

GEOL 5909 (formerly 67.599)
(GEO 7999)
M.Sc. Thesis
A thesis proposal must be approved by the
research advisory committee by the end of the
first year of registration.

GEOL 6909 (formerly 67.699) (GEO 9999)
Ph.D. Thesis
A thesis proposal must be approved by the
research advisory committee by the end of the
first year of registration.

The following geography courses are included
in the Centre's program:

**Department of Geography and Environ-
mental Studies, Carleton University**

GEOG 5300 (formerly 45.530)
Soil Thermal and Hydrologic Regimes
Characteristics of soil regimes, particularly in
freezing soils, role of soil properties; analytical
and numerical methods, including computer
simulation.

GEOG 5302 (formerly 45.532)
Soil Thermal and Hydrologic Properties
Instrumental techniques for investigation of
hydrological and thermal processes near the
Earth's surface, laboratory instrumentation and
analysis of laboratory and field procedures in
geotechnical science.

GEOG 5300 (formerly 45.533)
Periglacial Geomorphology
Permafrost, its distribution and significance,
seasonal ground freezing, ground thermal
regime, physical, thermodynamic, and
geotechnical properties of freezing and thawing
soils, terrain features ascribable to frost action,
and solifluction and patterned ground.

GEOG 5304 (formerly 45.534)
**Aspects of Clay Mineralogy and Soil
Chemistry**
The role of clay minerals in soils will be
considered from a geotechnical and/or biological
perspective.

GEOG 5803 (formerly 45.583)
Remote Sensing and Image Analysis
Radiometric, geometric and resolution
characteristics of remotely sensed data, image
processing algorithms, analysis of spectral,
textural, and contextual image information,
applications in vegetation mapping and
environmental analysis.

**Department of Geography, University of
Ottawa:**

GEG 5101
Field and Laboratory Research Methods A

GEG 5301
Cold Regions Hydrology and Geomorphology
Selected topics in the hydrology and
geomorphology of cold regions. Emphasis on
glacierized, periglacial, or nival environments.
This course will alternate with GEG 5701.

GEG 5307
**Research Design, Modeling and
Environmental Data Analysis**
Evaluation of the methodology of physical
geography. Research and the role of modeling
and advanced data analysis in contemporary
research. This course will alternate with GEG
5707.

GEG 5701
**Hydrologie et Géomorphologie des Régions
Froides**
Thèmes en hydrologie et en géomorphologie
des régions froides. Exploration approfondie
des environnements glaciaires, périglaciaires ou
nivaux. Cours offert en alternance avec GEG
5301.

GEG 5707
**Conception d'un Projet de Recherche,
Modélisation et Analyse de Données
Environnementales**
Évaluation des méthodes de recherche en
géographie physique. Rôle de la modélisation
et de l'analyse avancée des données dans la
recherche contemporaine. Cours offert en
alternance avec le GEG 5307.

GEG 7103
**Palaeoenvironmental Reconstruction and
Climate Change**
Theories of environmental change in relation to
natural and anthropogenically induced climate
change. Techniques used in
palaeoenvironmental reconstruction. This course
will alternate with GEG 7503.

GEG 7107
Northern Ecosystems
Dynamics of northern ecosystems with
particular emphasis on their sensitivity to climate
variability and climate change. This course will
alternate with GEG 7507.

GEG 7301
Field and Laboratory Research Method C

GEG 7503
**Reconstruction Paléoenvironnementale et
Changement Climatique**
Théories des changements environnementaux
mises en relation avec les changements
climatique d'origine naturelle ou d'origine
anthropique. Méthodes utilisées dans la
reconstruction paléoenvironnementale. Cours
offert en alternance avec GEG 7103.

GEG 7507
Ecosystèmes Nordiques
Dynamique des écosystèmes nordiques en mettant l'accent sur leur sensibilité à la variabilité et au changement climatiques. Cours offert en alternance avec GEG 7107.

GEG 7703
Méthodes de Recherche sur le Terrain et au Laboratoire D.

GEG 7107
Northern Ecosystems
Dynamics of northern ecosystems with particular emphasis on their sensitivity to climate variability and climate change. This course will alternate with GEG 7507.

GEG 7301
Field and Laboratory Research Method C

GEG 7503
Reconstruction Paléoenvironnementale et Changement Climatique
Théories des changements environnementaux mises en relation avec les changements climatique d'origine naturelle ou d'origine anthropique. Méthodes utilisées dans la reconstruction paléoenvironnementale. Cours offert en alternance avec GEG 7103.

GEG 7507
Ecosystèmes Nordiques
Dynamique des écosystèmes nordiques en mettant l'accent sur leur sensibilité à la variabilité et au changement climatiques. Cours offert en alternance avec GEG 7107.

GEG 7703
Méthodes de Recherche sur le Terrain et au Laboratoire D.

History

Paterson Hall 430
Telephone: (613)520-2834
Fax: (613) 520-2819
E-mail: grad_history@carleton.ca

Web site: www.carleton.ca/history

The Department

Chair of the Department, E.P. Fitzgerald

Departmental Supervisor of Graduate Studies, Bruce S. Elliott

The Department of History offers a 5.0 credit M.A. in History with the possibility of supervision in the following areas: Canadian, Continental European and British history, the history of Women, Gender, and Family, American, Modern Russian, International, and Medieval history; and a 6.0-credit M.A. concentration in Public History. We also offer a program of study and research leading to the Doctor of Philosophy degree with a concentration in Canadian history or History of Women, Gender, and Family. We strongly recommend that students consult the departmental Web site for further information about courses.

Master of Arts

Admission Requirements

The minimum requirement for admission to the master's program is an Honours bachelor's degree (or the equivalent) with at least high honours standing.

The Department offers no qualifying-year program; applicants with a general (3-year) degree may be considered for admission into the fourth year of Carleton's B.A.(Honours) program.

Program Requirements

Candidates may follow either a regular or Public History M.A. program, as follows:

Regular stream

- HIST 5807, HIST 5808, or HIST 5809: a seminar or tutorial in the historiography of the appropriate country or area (1.0 credit);
- HIST 5000: a study in the practical areas of history (0.5 credit);
- A graduate history seminar in the student's major field of concentration (1.0 credit);
- One additional seminar (1.0 credit), which may be chosen from those offered at the graduate or 4000-level by the Department of History, by another unit at Carleton University, or by the Department of History at the University of Ottawa;
- HIST 5909: thesis (1.5 credits).

Public History stream

- HIST 5807, HIST 5808, or HIST 5809: a seminar or tutorial in the historiography of the appropriate country or area (1.0 credit);
- HIST 5000: a study in the practical areas of history (0.5 credit);
- Introduction to Public History HIST 5700 (0.5 credit);
- Three other Public History courses, designated under the numbers HIST 5701 and HIST 5702 (1.5 credits);
- HIST 5703: Internship in Public History (0.5 credit);
- A graduate history seminar (1.0 credit);
- HIST 5908: research essay (1.0 credit).

M.A. students are required to submit thesis or research essay proposals to the graduate supervisor early in their second term of full-time enrolment.

Guidelines for Completion of Master's Degree

Full-time students in the regular stream are expected to finish all requirements for the degree except HIST 5909 during their first two terms of study; part-time students should do so during their first twelve terms of study. The thesis requirement is designed to take an additional two or three terms. Full-time students in the Public History stream are expected to complete HIST 5000, HIST 5807/8/9, Introduction to Public History and two other Public History half courses during Terms 1 and 2, their Internship during Term 3, and a seminar and additional Public History half credit during Term 1 of their second year; the research essay HIST 5908 is designed to take an additional one or two terms. Part-time students in Public History should complete all degree requirements within twelve terms of study.

Language Requirements

All candidates are required to demonstrate a reading knowledge of a language other than English, the choice to depend upon the field of the candidate's thesis or research. For seminars dealing with sources not in English, a reading knowledge of the appropriate language will be required before acceptance into the program. Details may be obtained from the supervisor of graduate studies.

Doctor of Philosophy

Admission Requirements

Applicants with an M.A. degree will be expected to have at least high honours standing. Applicants for the History of Women, Gender and Family program will be expected to have at least one of their earlier degrees in history.

An applicant with an Honours bachelor's degree who has achieved an outstanding academic record and, in addition, exhibits very strong motivation and high promise for advanced research, may be admitted to the Canadian Ph.D. program directly. Such candidates will be required to complete at least 15.0 credits.

Residence Requirement

The normal residence requirement for the Ph.D. degree is a minimum of three years of full-time study after the B.A. (Honours) degree, or two years after the M.A. degree.

Program Requirements

Candidates will be responsible for three fields: a major field (Canadian history or History of Women, Gender and Family) and two minor fields. In the case of Canadian history majors, at least one of the minor fields must concern American, British, French, Russian, or international history. In the case of History of Women, Gender and Family majors, at least one of the minor fields must concern American, British, Canadian, French, Russian, or international history. History of Women, Gender and Family majors must declare their area of concentration from among these fields. The second minor field for both majors may be a transnational topic or in a related discipline. In each instance, the minor field should cover approximately one century. Written examinations will be taken in the two minor fields before the end of the student's second term of study; an oral examination in the major field will be arranged during the student's fourth term. Ph.D. candidates are required to submit a thesis proposal to the graduate supervisor within three months of completing their oral examination.

A reading knowledge of French will be required. The language examination will be written early in the first post-M.A. year, and before the candidate is permitted to take the doctoral field examinations. Proven competence in an additional language may be required if it is pertinent to the candidate's program.

Students entering the 15-credit Canadian history program with a B.A.(Honours) will normally complete in their first year:

- HIST 5808
- HIST 5901
- HIST 5902
- Two other graduate seminars

They will then join students entering the Canadian history program with a completed M.A. degree, who will normally be required to follow:

- HIST 6808
- HIST 6900 Ph.D. oral comprehensive examination in Canadian history; in conjunction with
- HIST 6904 Ph.D. Tutorials
- Two of: HIST 6100; HIST 6400; HIST 6500; HIST 6600; HIST 6903; an approved course of studies in a related discipline. At least one of these must be a national history other than Canadian (i.e. HIST 6100, HIST 6400, or HIST 6500).

Students declaring a major field in History of Women, Gender and Family will normally be required to follow:

- HIST 6808
- HIST 6902 Ph.D. oral comprehensive examination in History of Women, Gender and Family; in conjunction with
- HIST 6905 Ph.D. Tutorials
- Two of: HIST 6100; HIST 6400; HIST 6500; HIST 6600; HIST 6901: an approved course of studies in a related discipline. At least one of these must be a national history (i.e., HIST 6100, HIST 6400, HIST 6500, or HIST 6901).

With other requirements completed, doctoral students will be required to write a thesis on a topic related to Canadian history or History of Women, Gender and Family history (5.0 credits).

Guidelines for Completion of Doctoral Degree

It is expected that full-time students will complete the thesis requirement within two years, and part-time students within four years.

University of Ottawa

A Carleton University student may take one seminar in the Department of History at the University of Ottawa, with permission of the two departments.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule

booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/. For further details concerning courses, see the departmental Web site at www.carleton.ca/history.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Admission to graduate seminars in the Department of History is normally restricted to graduate students in the Department and to others who have successfully completed two full upper-level undergraduate History courses, or the equivalent, in the general area of the seminar, or who have received permission of the Department.

HIST 5000 [0.5 credit] (formerly 24.500)
Foundations of Historical Practice
Study in the practical uses of history in such fields as teaching and methodology, research design, effective library, archival use.

HIST 5006 [1.0 credit] (formerly 24.506)
Medieval Intellectual History
An examination of selected aspects of medieval intellectual history. Also offered at the undergraduate level, with different requirements, as HIST 4006, for which additional credit is precluded.

HIST 5205 [1.0 credit] (formerly 24.525)
Society and Culture in Canada, 1850-1939
Changes to the structure and values of Canadian societies and their culture in the period of urban-industrial transition.

HIST 5206 [1.0 credit] (formerly 24.526)
Perspectives on State Formation in Canada
An exploration of selected problems of political history: the construction of official statistics, the language of governments, the invention of nationalisms, the making of political cultures, the autonomy of the state, the practices of bureaucrats, the political role of women, the encounter of the welfare state and families, the political economy of the state, communities and the state. Also offered at the undergraduate level, with different requirements, as HIST 4304, for which additional credit is precluded.

HIST 5300 [1.0 credit] (formerly 24.530)
Canadian Immigration and Ethnic History
An examination of immigration and ethnic history in a selected period between the eighteenth and twentieth centuries. Also offered at the undergraduate level, with different requirements, as HIST 4306, for which additional credit is precluded.

HIST 5301 [1.0 credit] (formerly 24.531)
French Canada Since Confederation
A study of topics relating to the political and social history of French Canada and to problems of cultural duality.

HIST 5302 [1.0 credit] (formerly 24.532)
Ontario in the Nineteenth Century

HIST 5303 [1.0 credit] (formerly 24.533)
Intellectual History of Canada
An intensive examination of selected aspects of Canadian thought from the early nineteenth century to the present.

HIST 5304 [1.0 credit] (formerly 24.534)
Problems of Growth and War in Canada, 1896-1921

HIST 5305 [1.0 credit] (formerly 24.535)
The Canadian Diplomatic Tradition
An examination of the origins, evolution, context, and intellectual content of Canadian diplomatic practices and policies.

HIST 5400 [1.0 credit] (formerly 24.540)
The Age of the American Revolution

HIST 5506 [1.0 credit] (formerly 24.556)
Historical Perspectives on Power
An inquiry into historical analyses of politics in light of the current social philosophical conceptions of power and consciousness, with reference to early modern England, and/or Canada in the nineteenth and twentieth centuries, and/or Latin America in the late colonial period, with particular emphasis on Mexico, depending on the instructor(s).

HIST 5507 [1.0 credit] (formerly 24.557)
Community in Early Modern England, 1450-1600

HIST 5508 [1.0 credit] (formerly 24.558)
Culture and Society in Eighteenth- and Nineteenth-Century Britain: Selected Topics

HIST 5509 [1.0 credit] (formerly 24.559)
Women in Nineteenth- and Twentieth-Century North America and Britain
An examination of the role and image of women in the context of social and economic development and of the family in North America and Britain.

HIST 5600 [1.0 credit] (formerly 24.560)
Revolutionary Russia, 1898-1921
An examination of various primary sources available for research on revolutionary Russia. A sound reading knowledge of Russian is required for admission.

HIST 5602 [1.0 credit] (formerly 24.562)
M.S. Gorbachev and the Collapse of the USSR
A study of the main reasons for the collapse of the USSR, with emphasis on the CPSU, Soviet ideological presumption, and its participation in the international arena. The nature of the USSR in the 1980s and Gorbachev's attempts at sweeping reform and their consequences provide the setting for this study.

HIST 5700 [0.5 credit]
Introduction to Public History
Introduces students to critical thinking about history's place in the public sphere, including history and popular culture, exhibiting history, the politics of the past, historical presentation and impact of digitization and other new information technologies, through lectures, readings, and field trips.

HIST 5701 [0.5 credit]
Archival Theory and Practice
Theories, methodologies and problems relating to archives and records management such as archival responses to the challenges of managing and preserving electronic records. Principles and concepts guiding the work of archivists will be addressed as well as records appraisal, collection, arrangement, description, etc.

HIST 5702 [0.5 credit]
Special Topics in Public History
Theoretical and practical instruction in topical areas such as "history and new media," "oral history," "museums and national memory," "community history," "visual media," "material history," etc.

HIST 5703 [0.5 credit]
Internship in Public History
Placement for a term, normally over the summer following the first year of study, to put into practice the precepts learned in course work. Students will be jointly supervised by their employers and a faculty member and evaluated on a written report on work and on assessment by the employer.

HIST 5800 [1.0 credit] (formerly 24.580)
Problems in International History

HIST 5807 [1.0 credit] (formerly 24.587)
Historiography: Women, Gender and Family
Intensive study of selected problems in the writing of the history of women, gender and family.

HIST 5808 [1.0 credit] (formerly 24.588)
Historiography of Canada
A seminar, primarily for graduate students in Canadian history, which examines the trends and methods of Canadian historical writing and the influences upon it.

HIST 5809 [1.0 credit] (formerly 24.589)
Historiography
A course of directed studies, leading to an oral comprehensive examination, in one of the following fields:

Modern France
The intensive study of selected problems in the writing of modern French political and social history.

Britain
The intensive study of a range of selected problems in the writing of sixteenth-century or nineteenth-century English history.

Modern Russia
Concentrated reading in Russian history and historiography with emphasis on the nineteenth and early twentieth centuries.

United States
A course in which the trends and methods of historical writing on the United States will be examined.

International History
A course in which the trends and methods of historical writing on international history will be examined.

Medieval History
Historical method and historiography of an aspect of the Middle Ages.

European Intellectual and Social History
Intensive study of a selected topic in the writing of European intellectual or social history during the seventeenth, eighteenth, or nineteenth centuries.

HIST 5901 [1.0 credit] (formerly 24.591)
Directed Studies in a Canadian Field
A program of supervised reading and preparation of written work in an area not covered by an existing graduate seminar.

HIST 5902 [1.0 credit] (formerly 24.592)
Directed Studies in a Non-Canadian Field
A program of supervised reading and preparation of written work in an area not covered by an existing graduate seminar.

HIST 5903 [0.5 credit] (formerly 24.593)
Directed Studies in a Canadian Field
A program of supervised reading and preparation of written work in an area not covered by an existing graduate seminar.

HIST 5904 [0.5 credit] (formerly 24.594)
Directed Studies in a Non-Canadian Field
A program of supervised reading and preparation of written work in an area not covered by an existing graduate seminar.

HIST 5905 [0.5 credit] (formerly 24.595)
Selected Topics in a Canadian Field
A seminar in an area not covered by an existing graduate course.

HIST 5906 [0.5 credit] (formerly 24.596)
Selected Topics in a Non-Canadian Field
A seminar in an area not covered by an existing graduate course.

HIST 5908 [1.0 credit] (formerly 24.598)
M.A. Research Essay
An examination of an approved topic in an area of departmental specialization or in an appropriate area of Public History. Available only to students in the Public History stream.

HIST 5909 [1.5 credits] (formerly 24.599)
M.A. Thesis
A substantial historical investigation. The subject will be determined in consultation with the Department, and a supervisor will be assigned. The candidate will be examined orally after presenting his/her thesis.

HIST 6100 [1.0 credit] (formerly 24.610)
Directed Studies
Preparation for a minor field examination in one of the following areas of modern European history: France, Russia, and international history.

HIST 6400 [1.0 credit] (formerly 24.640)
Directed Studies in United States History

HIST 6500 [1.0 credit] (formerly 24.650)
Directed Studies in British History

HIST 6600 [1.0 credit] (formerly 24.660)
Directed Studies in a Transnational Topic
Preparation for a minor field examination in an area not covered in another doctoral course.

HIST 6808 [1.0 credit] (formerly 24.688)
Historical Theory and Method
A course primarily for doctoral candidates in history, offered in alternate years, in which current trends in historical theory and methodology will be examined.

HIST 6900 [0.5 credit] (formerly 24.690)
Ph.D. Comprehensive Examination
Ph.D. oral comprehensive examination in Canadian history. The exam is undertaken in the student's fourth term.

HIST 6901 [1.0 credit] (formerly 24.691)
Canadian History Minor
A program of supervised reading in Canadian history leading to a written comprehensive examination for doctoral students whose major field is History of Women, Gender and Family. Students will attend HIST 6904 in the fall and winter terms.

HIST 6902 [0.5 credit] (formerly 24.692)
Ph.D. Comprehensive Examination
Ph.D. oral comprehensive examination in History of Women, Gender and Family. The exam is undertaken in the student's fourth term.

HIST 6903 [1.0 credit] (formerly 24.693)
History of Women, Gender and Family Minor
A program of supervised reading in History of Women, Gender and Family leading to a written comprehensive examination for doctoral students whose major field is Canadian history. Students will attend HIST 6905 in the fall and winter terms.

HIST 6904 [0.5 credit] (formerly 24.694)
Ph.D. Tutorials
A program of supervised reading with several instructors in preparation for the Ph.D. oral examination in Canadian history. Students must complete three terms (F, W & S) of this course before sitting the oral comprehensive examination.

HIST 6905 [0.5 credit] (formerly 24.695)
Ph.D. Tutorials
A program of supervised reading with several instructors in preparation for the Ph.D. oral examination in History of Women, Gender and Family. Students must complete three terms (F, W & S) of this course before sitting the oral comprehensive examination.

HIST 6909 [5.0 credits] (formerly 24.699)
Ph.D. Thesis

Industrial Design

Mackenzie Building 3470
Telephone: (613) 520-5672
Fax: (613) 520-4465

The School

Director of the School, M. de Leeuw

The School of Industrial Design does not offer a program at the graduate level. However, it does offer graduate-level courses, which can be used towards a degree program in the School of Architecture and in the Department of Mechanical and Aerospace Engineering in the Faculty of Engineering. Members of the school are available to supervise graduate research.

The interests and capabilities of the faculty members lie in the following areas:

User Studies
Applications of ergonomics and anthro-pometrics in industrial design; study of users from a market perspective.

Form Studies
Form development in industrial design; computer-aided design in industrial design.

Mass Production Studies
Advanced manufacturing methods in industrial design; quality and product life of manufactured goods.

Design Systems and Methods
Research and development in systems and methods as they apply to industrial design.

Contextual Studies
Cultural, social and ethical issues in industrial design.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

IDES 5000 [0.5 credit] (formerly 85.500)
Directed Studies in Industrial Design
Reading and research tutorials.

IDES 5301 [0.5 credit] (formerly 85.531)
Creative Problem Solving and Design
This course outlines problem-solving processes and how they can be applied in engineering design. The student will be introduced to and be expected to practice various systematic and creative problem-solving techniques. The emphasis is on the student's learning methodologies rather than accumulating information. The techniques may be successfully applied in any engineering specialty. (Also listed as MECH 5601.)

Information and Systems Science

See the School of Mathematics and Statistics; Department of Systems and Computer Engineering; and the School of Computer Science.

The Committee

Chair of the Committee, John Chinneck

The program of graduate study and research leading to the degree of Master of Science in Information and Systems Science is offered by the Committee with the cooperation of the Department of Systems and Computer Engineering, the School of Mathematics and Statistics, and the School of Computer Science.

The purpose of the program is to provide training in the use and application of computers, to those who have not studied extensively in this field at the undergraduate level. The process of using the computer in problem solving is stressed. The program is flexible, though individual concentrations are usually in one of three broad areas:

- computer applications in a particular field (e.g., communications, energy systems)

- algorithms and methodologies for solution of complex problems by computer (e.g., graph theory, operations research, optimization, simulation and modeling)

- computer methods and technologies (e.g., databases, software engineering, computer languages)

Close links are maintained with the scientific, industrial, and technological communities, and an effort is made to direct students to project work of current practical significance.

Qualifying-Year Program

Applicants who have a general (3-year) bachelor's degree, or who otherwise lack the required undergraduate preparation, may be admitted to a qualifying-year program. Refer to the General Regulations section of this Calendar for regulations governing the qualifying year.

Master of Science

Admission Requirements

Applicants should have an Honours bachelor's degree, or equivalent, with at least high honours standing, in mathematics, engineering, physics, chemistry, computer science, operations research, experimental psychology, econometrics, management science, or a related discipline. Undergraduate preparation should include at least 2.0 credits in computing and a minimum of 3.0 credits in mathematics, at least one of which is at the third-year level or higher. In addition, the student is required to have some knowledge of quantitative applications, such as numerical analysis, simulation, operations research, etc.

Admission to the program will be made through one of the three participating departments. Since space and laboratory facilities will be provided by one of the departments, students should apply through the department with which they wish to be most closely associated.

Program Requirements

The normal program comprises 4.0 credits and a 1.5 credit thesis; additional requirements may be stipulated, depending upon the individual student's background. With the approval of the Committee, students who have substantial work experience may be permitted to substitute, in place of the thesis, 1.5 credit courses, one of which must be a graduate project course.

Students must take at least 1.0 credit from the department in which they are registered, and at least 0.5 credit from each of the other two participating departments. Students must also take course ISYS 5802.

Each student should consult with his/her faculty adviser in the selection of a course pattern related to his/her principal area of interest.

Each candidate submitting a thesis will be required to undertake an oral examination on the subject of his/her thesis.

Course work may be completed on either a full-time or part-time basis. Thesis research normally requires full-time residence at the University; however, a candidate may be permitted to carry out thesis work off campus provided that suitable arrangements are made for supervision and experimental work, and prior approval is given by the Committee.

Guidelines for Completion of Master's Degree

Full-time students in the M.Sc. in Information and Systems Science will normally complete the degree requirements in two years and part-time students within four years. In order to meet this goal, full-time students should arrange a thesis supervisor within the first term of study, and should try to complete the course requirements as quickly as possible.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

ISYS 5802 [0.5 credit] (formerly 93.582)
Introduction to Information and Systems Science
An introduction to the process of applying computers in problem solving. Emphasis is placed on the design and analysis of efficient computer algorithms for large, complex problems. Applications in a number of areas are presented: data manipulation, databases, computer networks, queuing systems, optimization. (Also listed as MATH 5802, SYSC 5802, COMP 5802.)

ISYS 5908 [1.5 credits] (formerly 93.598)
M.Sc. Thesis in Information and Systems Science
(Also listed as MATH 5908, SYSC 5908, COMP 5908.)

School of Mathematics and Statistics

Undergraduate Courses
MATH 3001   Real Analysis
MATH 3002   Advanced Calculus
MATH 3100   Modern Algebra
MATH 3500   Mathematical Statistics
MATH 4003   Functional Analysis
STAT 4501   Probability Theory
STAT 4502   Survey Sampling
STAT 4503   Applied Multivariate Analysis
STAT 4506   Non-Parametric Methods
STAT 4507   Statistical Inference
STAT 4508   Stochastic Models
STAT 4509   Topics in Stochastic Optimization and Advanced Mathematical Modeling
MATH 4700   Partial Differential Equations
MATH 4701   Topics in Partial Differential Equations
MATH 4703   Qualitative Theory of Ordinary Differential Equations
MATH 4801   Topics in Combinatorics
MATH 4802   Introduction to Mathematical Logic

MATH 4803   Computable Functions
MATH 4805   Theory of Automata
MATH 4806   Numerical Linear Algebra
MATH 4807   Game Theory
MATH 4808   Graph Theory and Algorithms
MATH 4906   Directed Studies

Graduate Courses
MATH 5007, MATH 5008, MATH 5107, MATH 5109, STAT 5502, STAT 5503, STAT 5504, STAT 5505, STAT 5506, STAT 5507, STAT 5508, STAT 5509, STAT 5601, MATH 5605, MATH 5607, MATH 5609, STAT 5701, MATH 5801, MATH 5803, MATH 5804, MATH 5805, MATH 5806, MATH/COMP 5807, MATH 5808, MATH 5809, MATH 5900, MATH 5901, MATH 5903

Department of Systems and Computer Engineering

Undergraduate Courses
SYSC 3003   Introduction to Real-Time Systems
SYSC 3100   Systems Analysis
SYSC 3303   Real-Time Concurrent Systems
SYSC 3501   Communication Theory
SYSC 3601   Microprocessor Systems
SYSC 4001   Operating Systems
SYSC 4005   Discrete Simulation and its Applications
SYSC 4405   Discrete Time Systems
SYSC 4507   Architecture of Computer Systems
SYSC 4600   Digital Communications
SYSC 4602   Introduction to Computer Communications
SYSC 4800   Software Engineering
SYSC 4801 - Software Engineering Project
SYSC 4805   Computer Systems Design Laboratory

Graduate Courses
SYSC 5001, SYSC 5004, SYSC 5005, SYSC/COMP 5007, SYSC 5101, SYSC 5107, SYSC 5108, SYSC 5109, SYSC 5201, SYSC 5207, SYSC 5301, SYSC 5305, SYSC 5308, SYSC 5401, SYSC 5402, SYSC 5502, SYSC 5503, SYSC 5504, SYSC 5508, SYSC 5600, SYSC 5601, SYSC 5602, SYSC 5603, SYSC 5604, SYSC 5605, SYSC 5606, SYSC 5607, SYSC 5608, SYSC 5609, SYSC 5701, SYSC 5703, SYSC 5704, SYSC 5706, SYSC 5707, SYSC 5709, SYSC 5801, SYSC 5803, SYSC 5804, SYSC 5906

School of Computer Science

Undergraduate Courses
COMP 3000   Operating Systems
COMP 3004   Software Systems Development
COMP 3005   Database Management Systems
COMP 4001   Distributed Computing
COMP 4002   Computer Graphics
COMP 4003   Transaction Processing Systems
COMP 4007   Applied Artificial Intelligence
COMP 4009   Introduction to Parallel and Systolic Computing

COMP 4100   Multimedia Systems
COMP 4103   Computer   Security   and
             Cryptography

Graduate Courses
COMP 5001, COMP 5002, COMP 5003, COMP
5004, COMP 5005, COMP 5006, SYSC/COMP
5007, COMP 5008, COMP 5009, COMP 5100,
COMP 5101, COMP 5102, COMP 5103, COMP
5104, COMP 5105, COMP 5106, COMP 5200,
COMP 5202, COMP 5204, COMP 5206, COMP
5208, COMP 5703, COMP 5704

Due to the interdisciplinary nature of ISS, a
student will in some cases benefit by taking an
undergraduate course at the 3000- or 4000-
level as part of his/her program. Where a 3000-
level course is to be taken, it will be extra to the
degree requirements; or else arrangements will
be made to enrich the subject matter, normally
through a directed study course with the
professor. Students may include 1.0 credit at
the 4000-level in their program without penalty,
with the approval of the Department. The 3000-
and 4000-level courses listed here are those
most likely to interest ISS students; see the
Undergraduate Calendar for a complete list.
Students in the program are prohibited from
taking COMP 4804 Design and Analysis of
Algorithms due to overlap of course material
with ISYS 5802.

Interdisciplinary Studies

Dunton Tower 2216
Telephone: (613) 520-2368
Fax: (613) 520-3985

The Institute

Director of the Institute, Andrew Brook

Associate Director and Coordinator of Directed Interdisciplinary Studies, Charles C. Gordon

The Institute of Interdisciplinary Studies offers graduate level courses which can be used towards a degree program in another discipline.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

ISSC 5100 [0.5 credit] (formerly 03.510)
Researching Across Disciplines
Focuses on cross-disciplinary research issues and methodological solutions to problems that arise in the dialogue among the sciences, humanities and social sciences.

International Affairs

Paterson Hall, Level 2A
Telephone: (613) 520-6655
Fax: (613) 520-2889
Email: international_affairs@carleton.ca
Web site: www.carleton.ca/npsia/

The School

Director of the School, Fen O. Hampson

Associate Director, Dane Rowlands

The Norman Paterson School of International Affairs (NPSIA) was established in the mid-1960s with the generous support of the late Senator Norman M. Paterson to encourage and promote graduate study and professional research and publications in the field of international affairs. The NPSIA program is interdisciplinary, reflecting the philosophy that exposure to a range of disciplines is necessary to develop an understanding of our complex global environment.

NPSIA's program puts an emphasis on imparting professional skills as well as knowledge. Our courses are policy as opposed to theoretically oriented and frequently involve the use of case studies and simulations. The great majority of our students see the M.A. as their path to the workforce. NPSIA graduates find employment in Canada and abroad in government departments, non-governmental and international organizations, and the private sector. More detailed information on the range of jobs held by NPSIA graduates can be found on our Web site.

NPSIA is a long-standing member of the Association of Professional Schools of International Affairs (APSIA), an association of the leading graduate programs in international affairs in countries that include the United States, France, Japan, and Russia. Like other APSIA schools NPSIA's raison d'être is the training of students for leadership in a world in which the destinies of all countries are increasingly linked by considerations of conflict resolution and peacebuilding, international trade and finance, development, and the sharing of human and natural resources. Many professionals currently working in the sphere of international affairs are alumni of APSIA graduate programs. Like its peers in APSIA, NPSIA is proud of its reputation for producing diverse, well-educated and sophisticated international affairs professionals.

The program is organized around six clusters:

- International Trade Policy
- Global Finance, Multinationals and the State
- Conflict Analysis and Conflict Resolution
- Human Security and Global Governance
- International Dimensions of Development
- National and Sub-National Aspects of Development

Students are encouraged to include at least one regional course in their degree program to provide an area focus to their studies. NPSIA offers a range of regional courses that can be linked to relevant course clusters to give students some regional expertise. NPSIA cooperates closely with the Institute of European and Russian Studies and with committees organized to encourage and coordinate faculty and student interests in Africa, Asia and Latin America.

NPSIA has a specialized Resource Centre staffed by a full-time information specialist. Students and faculty have access to a broad range of current research materials, using the resources of the national capital area as well as internet-based bibliographic services across the range of issues and regions on which courses are offered.

Qualifying-Year Program

Admission Requirements

The qualifying-year program is designed to enable students with at least high honours standing, but with an inadequate background in the disciplines relevant to the M.A. program, to make up deficiencies. Candidates with a high standing in a general (3-year) bachelor's degree, in a discipline closely related to international affairs, will be required to take five full qualifying-year credits before being eligible to enter the master's program. Those with a B.A.(Honours) degree in an unrelated discipline may be required to take at least three full qualifying-year credits before being eligible to enter the master's program.

Students in the qualifying year are encouraged to select a cluster or clusters in which they are interested and to take courses that will prepare them for graduate work in that cluster. Courses in anthropology, economics, geography, history, law, political science, and sociology, among other disciplines, are recommended. Students may also wish to select an area emphasis and to take courses that will enable them, in the M.A. year, to engage in specialized study of a region having particular relevance to the cluster(s) they have identified. Students should also be cognizant of the language requirement at the M.A. level and, if necessary, take the appropriate courses to enable them to fulfil that requirement.

Students who have not previously completed a full-year introductory course in Economics must

do so as part of their Qualifying Year Program. Students should also select at least one of ECON 3601, ECON 3602, or ECON 3603 depending on their cluster interests. Other courses will be selected in consultation with the student's supervisor or the Associate Director. Students who have not taken an introductory course in international politics should consider enrolling in PSCI 2601 and PSCI 2602.

Admission to the qualifying year does not guarantee admission to the M.A. program. To be considered for admission to the M.A. program, students in the qualifying year are expected to achieve the equivalent of high honours standing. Students in the qualifying year are considered for admission to the M.A. program at the same time as other applicants; if qualifying-year students are not admitted to the M.A. program in the first round of admissions, subsequent decisions on their admission will depend on performance and the availability of space in the M.A. program.

Guidelines for Completion of Qualifying Year

Candidates admitted to the qualifying-year program on a full-time basis must complete all requirements during the fall and winter terms after initial registration.

Master of Arts

Admission Requirements

The minimum requirement for admission into the master's program is a B.A.(Honours) degree in a discipline related to international affairs.

Under current practice, at least a high honours standing is normally required for consideration for admission to the program.

Applicants may submit Graduate Record Examination aptitude test scores; in some circumstances, students may be required to submit GRE scores.

The Faculty of Graduate Studies and Research requires applicants whose native tongue is not English to be tested for proficiency in English, as described in Section 3.6 of the General Regulations of this Calendar.

Students admitted to the NPSIA M.A. program are strongly advised to complete an introductory course in economics prior to beginning the master's program. Students without an introductory economics course will be required to complete such a course prior to graduation. This course will be extra to degree and may delay completion of the M.A. program. Candidates who lack the required background in international affairs will be expected to complete a maximum of two additional courses.

Students who are uncertain about whether they meet the background requirements are encouraged to contact the School.

The deadline for completed applications is January 31. The deadline for consideration for financial assistance is also January 31. Applicants are responsible for ensuring that their completed applications are received at NPSIA by the deadline.

Program Requirements

Students may follow either a thesis/research essay program or a course work program.

Thesis/Research Essay Program

The normal program requirements for M.A. students in international affairs are:

- Completion of INAF 5001 Policy and Methods for International Affairs and one of INAF 5009, INAF 5308 or INAF 5309 depending on a student's choice of cluster. If a student can demonstrate that he/she has already completed the equivalent of the designated NPSIA economics course, he/she may substitute another NPSIA course;

- Completion of at least two designated courses from the student's chosen cluster;

- 1.0 approved course work credits in international affairs or related disciplines, if a student elects to write a thesis;

- 2.0 approved course work credits in international affairs or related disciplines, if a student elects to write a research essay;

- A thesis (equivalent to 2.0 credits) or a research essay (equivalent to 1.0 credit) involving original research on an approved subject in international affairs relating to the student's cluster choice;

- Full-time students are expected to submit a thesis/research essay proposal by the end of January following their first term of study in the program; part-time students are expected to submit a thesis/research proposal after completion of half of their course requirements;

- An ability to read a second major international language, or a language appropriate to a student's major research interest;

- English-speaking Canadian students are expected to develop a proficiency in French;

- An oral comprehensive examination on the thesis or research essay in their general field of study to determine the candidate's ability to relate various disciplines to the study of international affairs.

Course Work Program

- Completion of INAF 5001 Policy and Methods for International Affairs and one of INAF 5009, INAF 5308 or INAF 5309 depending on a student's choice of cluster. If a student can demonstrate that he/she has already completed the equivalent of the designated NPSIA economics course, he/she may substitute another NPSIA course.

- Completion of at least two designated courses from the student's chosen cluster.

- Three approved courses selected as in thesis/ research essay program excluding INAF 5908/INAF 5909;

- Language requirement as in thesis/research essay program;

- An oral comprehensive examination (INAF 5907) in the candidate's cluster and program to determine the candidate's ability to relate various disciplines to the study of International Affairs. The examination will normally be taken upon the completion of course work requirements. The student opting for the INAF 5907 option will identify two courses and a paper which will form the basis of the oral examination, one of which must be a designated course from his/her cluster. The paper may come from either of the two courses.

Academic Standing

A grade of B- or better must be obtained in each credit counted towards the master's degree. The School does not permit exceptions to this rule.

Career Planning

Information on job opportunities is available to all students and recent graduates through NPSIA's Resource Centre Coordinator. NPSIA produces two publications – *NPSIA Works: Career Futures* and *NPSIA Works: Getting There* – designed to assist students in obtaining jobs in International Affairs after graduation. Recent experience suggests that a strong background in research methods and economics as well as strong communications skills enhance job placement.

Students interested in continuing to doctoral programs should plan their programs to include courses in their discipline, if other than international affairs, which may be deemed necessary for their admission to doctoral programs. Interdisciplinary doctoral programs in international affairs are given in a number of institutions, and the faculty can provide guidance in planning for these programs.

Guidelines for the Completion of the Master's Degree

Candidates can complete the M.A. program in twelve months of full-time study. However, most students require an additional one or two terms to complete the research essay or thesis requirement. Full-time master's students must complete all degree requirements within six terms of registered full-time study.

Part-time master's students must complete degree requirements within an elapsed period of six calendar years after the date of initial registration.

Students who elect to complete the program by a combination of full-time and part-time study are governed by the following elapsed time limitations: five calendar years if the candidate is registered as a full-time student for two or three terms and part-time for the balance; four calendar years if the candidate is registered for four or five terms as a full-time student and part-time for the balance.

These limitations are calculated from the date of initial registration in the master's program.

Certificate in Health and Social Policy in Development

The Norman Paterson School of International Affairs, in conjunction with the Canadian Association of University Schools of Nursing, the Centre for International Health and Development at the University of Ottawa, and the International Development Research Centre, offers a Certificate in Health and Social Policy in Development.

The Certificate program is intended for practitioners in the health and social policy fields who wish to upgrade or re-orient their careers with a focus on international development.

Students are advised to contact the School for information on admission and program requirements, course scheduling, and fee schedules.

Master of Arts/Bachelor of Laws

The Norman Paterson School of International Affairs and the Common Law Section of the Faculty of Law at the University of Ottawa offer a joint Master of Arts in International Affairs and Bachelor of Laws degree (M.A./LL.B.).

Admission Requirements

A student must make separate applications to the School of International Affairs at Carleton University and to the Faculty of Law at the University of Ottawa and be accepted by both institutions in accordance with the normal admission requirements of each program.

Interest in pursuing the joint program must be specified in each application, and a joint committee will make a decision on admission to the joint program.

Program Requirements

A student will complete both the M.A. and the LL.B. programs over four calendar years. Students will be expected to fulfil the normal requirements of both the M.A. and LL.B. programs. In addition, students in the joint program will be required to complete courses in international law to be specified by the Faculty of Law.

In undertaking the research essay/thesis, students will be expected to integrate both components of the joint program into their research essay/thesis and will be assigned supervisors from both institutions.

The normal sequence of courses for the two degrees is as follows:

First Year
• Normal LL.B. first year

Second Year
• Normal M.A. first year (required course work to include a 0.5 credit course in international law)

Third Year
• Normal LL.B. second year, including 0.5 credit course from the School of International Affairs for which credit will be given in both programs and spring/summer registration in M.A. research essay/thesis

Fourth Year
• Normal LL.B. third year, including 0.5 credit course from the School of International Affairs for which credit will be given in both programs and spring/summer registration, conclusion and defence of M.A. research essay/thesis

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Part-time students are permitted to enrol in a maximum of 1.0 credit per term.

Required Courses

INAF 5001 [0.5 credit] (formerly 46.501)
Policy and Methods for International Affairs
Policy formulation and research methods in an international context. The policy component reviews key theories of policy formulation and their relationship to applied policy analysis and evaluation. The methods component examines the principles of social sciences research, basic research design, and techniques of analysis.
Prerequisite: M.A. standing in the Norman Paterson School of International Affairs or permission of the School.

INAF 5009 [0.5 credit] (formerly 46.509)
Economic Development: Theory and Policy
This course examines economic theory and policy dimensions of development. Topics include: different concepts and goals of development policy, strategies for sectoral development, technology transfer, trade policy, domestic and foreign resource mobilization, monetary and fiscal policy, and the economics of human development and environmental sustainability.
Prerequisite: M.A. standing in the Norman Paterson School of International Affairs or permission of the School.

INAF 5308 [0.5 credit] (formerly 46.538)
International Trade: Theory and Policy
This course examines the pure theory of international trade and selected policy issues. Topics include theories of the pattern of trade, the gains from trade, the theory of distortions and welfare, and theories of endogenous trade policy formation.
Prerequisite: M.A. standing in the Norman Paterson School of International Affairs or permission of the School.

INAF 5309 [0.5 credit] (formerly 46.539)
International Finance: Theory and Policy
This course examines theory and policy in open economy macroeconomics and international finance. Topics include: exchange rate and output determination, balance of payments adjustment, monetary and fiscal policy under different exchange rate regimes, and the structure and performance of the international monetary system.
Prerequisite: M.A. standing in the Norman Paterson School of International Affairs or permission of the School.

Note: Students are required to take the Economics course appropriate to their cluster. The appropriate course will be determined in consultation with NPSIA faculty. If a student can demonstrate that he/she has already completed the equivalent of the designated NPSIA economics course, he/she may substitute another NPSIA course.

Clusters

NPSIA's M.A. program is organized around six clusters. Each student must select a cluster and enrol in two of the designated cluster courses.

International Trade Policy

Designated Courses:

INAF 5101   The Politics and Institutions of International Trade

INAF 5400   Trade Policy Analysis

INAF 5500   Comparative Trade Policy

INAF 5507   International Economic Law

Global Finance, Multinationals and the State

Designated Courses:

INAF 5300   The Political Economy of Multinational Enterprises

INAF 5401   International Financial Institutions and Policy

INAF 5501   Global Political Economy

INAF 5502   State Sovereignty and Globalization

Conflict Analysis and Conflict Resolution

Designated Courses:

INAF 5108   Conflict Analysis

INAF 5109   Conflict Management: Theory and Evidence

INAF 5200   Peacebuilding and Reconstruction: Theory and Practice

INAF 5203   International Mediation and Conflict Resolution

Human Security and Global Governance

Designated Courses:

INAF 5405   International Organizations in International Affairs

INAF 5505   International Law: Theory and Practice

INAF 5600   Human Resource Development

INAF 5701   Global Environment Change

International Dimensions of Development

Designated Courses:

INAF 5002   Issues in International Development

INAF 5303   Science, Technology and International Affairs: The Third World

INAF 5602   The Institutional Framework for Development Assistance

INAF 5801   Regional Integration Among Developing Countries

National and Sub-National Aspects of Development

Designated Courses:

INAF 5003   National and Domestic Dimensions of Development

INAF 5006   Agriculture and Rural Development

INAF 5600   Human Resource Development

INAF 5601   Historical Dimensions of Development and Underdevelopment

Other Courses

INAF 5002 [0.5 credit] (formerly 46.502)
Issues in International Development
International political, social and economic aspects of development. Topics include: approaches to trade policies, finance, regional integration, technology transfer and transnational enterprises, global governance, international civil society and development, the environment and natural resources, and social and labour issues in the international context.
Precludes additional credit for INAF 5004 (taken prior to 2001).

INAF 5003 [0.5 credit] (formerly 46.503)
National and Domestic Dimensions of Development
Theoretical foundations and central policy issues of the domestic, economic, social, political, cultural and environmental aspects of development. Topics include theories of the developmental process, human resource development, national development strategies, sectoral issues, and governance and human rights and their interaction with the international system.
Precludes additional credit for INAF 5004 (taken prior to 2001).

INAF 5006 [0.5 credit] (formerly 46.506)
Agriculture and Rural Development
A study of the agricultural sector, rural areas, and rural welfare in developing countries, including consideration of structural change in agriculture, agrarian reform, rural development strategies in various countries, and public policies affecting agriculture, activities ancillary to agriculture, rural industry, and public service.

INAF 5007 [0.5 credit] (formerly 46.507)
Theories of Development and Underdevelopment
A comparative analysis of approaches to the study of development processes and underdevelopment, including structural-functional, neo-classical, Marxist, and dependency theories.
Prerequisite: Enrolment in the Development Administration stream of the M.A. program in the School of Public Policy and Administration, or permission of the School.

INAF 5008 [0.5 credit] (formerly 46.508)
Economic Development Policy and Planning
Developing country policies and planning and their impacts, including macro and sectoral techniques employed in development planning, budgeting, and problems in development administration.
Prerequisite: Enrolment in the Development Administration stream of the M.A. program in the School of Public Policy and Administration, or permission of the School.

INAF 5100 [0.5 credit] (formerly 46.510)
Canada in International Affairs
This course examines Canada's role in international affairs with special attention to issues of conflict and conflict resolution, international political economy, and international development. Both the content and formulation of Canada's international policies are analyzed.

INAF 5101 [0.5 credit] (formerly 46.511)
The Politics and Institutions of International Trade
The course considers Canadian trade practice, places trade policy within the broader context of Canadian policy-making, and compares Canadian policy and practice to that in the United States, Europe, Japan, and the major developing countries.
Precludes additional credit for INAF 5409 (taken prior to 1997-98).

INAF 5108 [0.5 credit] (formerly 46.518)
Conflict Analysis
This seminar examines the sources of international and intrastate conflict. Students will gain practical insight and understanding of the causes of conflict by drawing on frameworks from a number of social sciences disciplines, with a focus on diagnostic and analytical skills in the decision making process.
Precludes additional credit for INAF 5105 (taken prior to 2001).

INAF 5109 [0.5 credit] (formerly 46.519)
Conflict Management: Theory and Evidence
An evaluation of both process and content-oriented measurements of effectiveness in the practice of conflict management with special attention to third party intervention such as peacekeeping, crisis decision making, the management of terrorism and conflict prevention with applications to regional and intrastate conflict.
Precludes additional credit for INAF 5105 (taken prior to 2001).

INAF 5200 [0.5 credit] (formerly 46.520)
Peacebuilding and Reconstruction: Theory and Practice
This course focuses on the social, economic and military dimensions of post-conflict reconstruction with special attention to the role of local and international government and non-government organizations in the peacebuilding process. Evidence is drawn from recent cases.

INAF 5201 [0.5 credit]
Theory and Practice of Arms Control
This course explores the theoretical and analytical underpinnings of modern arms control, including nuclear non-proliferation issues in the post Cold War era with special emphasis on the impact of political, economic, technological and social-psychological factors on international security.

INAF 5202 [0.5 credit] (formerly 46.522)
International Security After the Cold War
This course examines the evolving strategic and security environment in international relations after the Cold War, addressing both traditional and non-traditional concepts of national and international security. Topics discussed include new threats to security such as transnational crime, forced migration and international terrorism.

INAF 5203 [0.5 credit] (formerly 46.523)
International Mediation and Conflict Resolution
This seminar explores various approaches to the prevention, management and resolution of international conflict. These approaches may include, peacekeeping, preventive diplomacy, mediation and peacebuilding, as well as less formal mechanisms for third party collaborative problem solving.

INAF 5204 [0.5 credit]
Intelligence, Statecraft and International Affairs
The role of intelligence in foreign and security policy after the Cold War. Evolution of intelligence as regards strategic and policy requirements, the capabilities of selected services, interactions within government and civil society. Particular attention to the structure and functions of Canada's intelligence community.

INAF 5207 [0.5 credit] (formerly 46.527)
Middle East Economic and Political Relations
A course on economic and political relations among countries of the Middle East. Emphasis will be placed on the peace process and arrangements for regional security and regional economic cooperation, among them the prospects for regional collaboration.

INAF 5209 [0.5 credit] (formerly 46.529)
Conflict in Southern Africa
A critical examination of competing interpretations of conflict in southern Africa, including approaches to conflict resolution.

INAF 5300 [0.5 credit] (formerly 46.530)
Political Economy of Multinational Enterprises
An appreciation of recent economic and political developments in the fields of international economics and industrial organization as they affect multinational enterprises. The course develops concepts and analytical approaches to examine the impact of multinational enterprises on international affairs and the implications for public policy.

INAF 5302 [0.5 credit] (formerly 46.532)
Science, Technology and International Affairs: The Advanced, Industrial Countries
This seminar analyzes the process of technological change since the industrial revolution and examines its consequences for development in the advanced industrial countries and for relations among these countries.

INAF 5303 [0.5 credit] (formerly 46.533)
Science, Technology and International Affairs: The Third World
This seminar focuses upon the problem of building indigenous technological capabilities in the Third World. It examines the role of MNCs in the transfer of technology, the generation of appropriate technologies locally and the role of the state in the formulation of technology policy for development.

INAF 5304 [0.5 credit] (formerly 46.534)
Agribusiness North and South
Analysis of the transformation of agriculture into an integrated multi-sectoral food production system and of its theoretical implications. Focus on the growth and strategies of agribusiness institutions in advanced industrial societies and on their penetration into, and impact upon, Third World economies.(Also listed as GEOG 5508.)

INAF 5305 [0.5 credit] (formerly 46.535)
International Bargaining and Negotiation: Theory and Practice
An examination of bargaining and negotiation in international economic, political, and security issue areas, emphasizing case studies as well as theoretical analysis.

INAF 5306 [0.5 credit] (formerly 46.536)
Introduction to the North American Free Trade Agreement (NAFTA)
An examination of the background to NAFTA, the negotiation of NAFTA and the side agreements, the provisions of NAFTA, the evolution of political, economic, and social relations in North America since the implementation of NAFTA, and the processes and implications of accession of other countries.

INAF 5307 [0.5 credit] (formerly 46.537)
Macroeconomics in a Development Context
An examination of macroeconomic theory and policy in the context of the developing countries, with special emphasis upon theory and policy for open economies, structural adjustment to international disequilibration, exchange rate and balance of payments management, fiscal and financial policy.
Prerequisite: Enrolment in the Development Administration stream of the M.A. program of the School of Public Policy and Administration, or permission of the School.

INAF 5400 [0.5 credit] (formerly 46.540)
Trade Policy Analysis
This course examines selected trade and trade-related policy issues. Topics are drawn from current policy debates, and may include: multilateral vs. preferential trade liberalization; standards harmonization as a precondition for free trade; and globalization and the rising skill wage premium.
Prerequisites: INAF 5308 or the equivalent, M.A. standing in the Norman Paterson School of International Affairs, or permission of the School.

INAF 5401 [0.5 credit] (formerly 46.541)
International Financial Institutions and Policy
An examination of institutional arrangements, international financial flows, and critical events in the field of international finance. The emphasis is on tracing the development and operation of international financial institutions, and how they have shaped modern financial markets, events, and policy.
Precludes additional credit for INAF 5409 (taken prior to 1997-98).

INAF 5402 [0.5 credit] (formerly 46.542)
Territory and Territoriality
Contemporary geographical and international relations theorizing is challenging conventional notions of boundaries and territories in the political organization of modernity. Using contemporary writings on geopolitics, security, sovereignty, self-determination and identity politics, this course investigates territoriality as a political and intellectual strategy. (Also listed as GEOG 5400.)

INAF 5404 [0.5 credit] (formerly 46.544)
The Environment for International Management
Analysis of the international economic environment for public and private sector managers. The course examines the growing economic interdependence of nations, the problems faced by managers and the effectiveness of emerging international rules and standards for trade, investment and intellectual property.

INAF 5405 [0.5 credit] (formerly 46.545)
International Organizations in International Affairs
A critical analysis of the roles played by the United Nations and other international organizations in the field of international conflict, development, and political economy.

INAF 5406 [0.5 credit] (formerly 46.546)
Policy Analysis and Evaluation
An examination of the international public policies of a number of countries, including Canada. The seminar focuses on various approaches to the policy process and examines case studies of the formulation and evaluation of economic, political, and security policies.

INAF 5407 [0.5 credit] (formerly 46.547)
International Relations Theory
This course provides an overview of theories of international relations. Organized both historically and conceptually, the course will examine a variety of theoretical approaches to international relations, among them the realist, liberal, structural, neo-realist, and critical perspectives.

INAF 5408 [0.5 credit] (formerly 46.548)
Gender in International Affairs
This course examines the role of gender differences in international affairs. It analyzes the concept of gender in the social sciences and considers feminist theories regarding war, nationalism, human rights, development, and the global economy.
Precludes additional credit for INAF 5409 (taken prior to 1997-98).

INAF 5409 [0.5 credit] (formerly 46.549)
Selected Topics in International Affairs

INAF 5500 [0.5 credit] (formerly 46.550)
Comparative Trade Policy
An examination of the trade policies of various states, and their associated institutional arrangement. Countries and country groupings to be examined include the United States, Japan, the European Union, and key developing countries.

INAF 5501 [0.5 credit] (formerly 46.551)
Global Political Economy
A presentation of theories and approaches to global political economy, and how they illuminate the interaction and co-evolution of states and markets. Topics include the post war systems and patterns of production, investment, trade and finance in developed and developing countries.
Precludes additional credit for INAF 5000 (taken prior to 2001).

INAF 5502 [0.5 credit] (formerly 46.552)
State Sovereignty and Globalization
An examination of how increased political, social and economic integration internationally affects a government's ability to formulate policy. The course examines a variety of domestic and international policy issues and analyzes whether and how global forces and their domestic counterparts shape the policy-making environment.
Precludes additional credit for INAF 5000 (taken prior to 2001).

INAF 5505 [0.5 credit] (formerly 46.555)
International Law: Theory and Practice
Examines various theoretical perspectives on international law and locates role international law plays in the international system. Topics include basis, creation and sources of international law, international dispute resolution, and international law and world order transformation. (Also listed as LAWS 5603.)

INAF 5507 [0.5 credit] (formerly 46.557)
International Economic Law: Regulation of Trade and Investment
Study of regulation of international economic relations. Discussion of international institutions, legal aspects of integration, governmental regulation of trade and investment. (Also listed as LAWS 5200.)
Prerequisite: Open only to graduate students in their master's year who have not previously studied international economic law.

INAF 5600 [0.5 credit] (formerly 46.560)
Human Resource Development
An analysis of theory and policy regarding some of the major areas of human development in the developing areas, including demography and population, education, public health, nutrition, women and development, social security, employment, and manpower planning.

INAF 5601 [0.5 credit] (formerly 46.561)
Historical Dimensions of Development and Underdevelopment
Comparative studies in the economic and social history of selected developed and developing countries. The aim is to identify conditions which have fostered or inhibited development in the past, and thereby to assess contemporary development strategies in the light of historical experience.

INAF 5602 [0.5 credit] (formerly 46.562)
International Assistance: Institutions, Policies, Programs, Performance Assessments
The course examines the policies and programs of governmental, non-governmental and multilateral organizations involved in international development assistance. Particular attention is paid to their political dynamics, strategic orientations, administrative operations, transfer mechanisms, operational priorities and developmental impact.

INAF 5603 [0.5 credit] (formerly 46.563)
Issues in Development in Africa
Analysis of structures and processes of political, social, and economic change in intertropical

Africa at scales ranging from the intrahousehold and local community to the state and international system. An objective will be to integrate gender and the environment into analyses which draw on theories of political economy. (Also listed as GEOG 5200.)

INAF 5604 [0.5 credit] (formerly 46.564)
Issues in Development in Latin America
An examination of the principal developmental trends, problems, and policies in the region as they have evolved since 1945. Emphasis will be given to the design and implementation of alternative developmental strategies in the future.

INAF 5605 [0.5 credit] (formerly 46.565)
The Ethical Dimension of International Affairs
This course critically examines the ethical dimensions of development, global conflict, and international political economy. Subject matter includes beliefs and values, rights and obligations, and individual and state morality.

INAF 5606 [0.5 credit] (formerly 46.566)
Indigenous Peoples and Development
An examination of some major issues of the development, in its social, economic, political and environmental dimensions of Indigenous Peoples, including those of North America, Latin America, Australasia, India, Africa and the Polar Regions.

INAF 5607 [0.5 credit] (formerly 46.567)
Issues in Development in Southeast Asia
This course offers a comparative analysis of the development experience of selected Southeast Asian countries. It addresses the processes of continuity and change in political culture, governance, economic management, social and environmental policy, and regional ASEAN relations. Attention is paid to historical and contemporary issues.

INAF 5608 [0.5 credit] (formerly 46.568)
Indigenous Perspectives on Third World Development
This course examines some of the major perspectives and theories on Third World Development which have emerged from within the Third World. Included are authors representing structural, dependency, and radical theories of development, as well as those who see development as psychological or spiritual liberation.

INAF 5609 [0.5 credit] (formerly 46.569)
Development Project Evaluation and Analysis
An examination of social cost-benefit analysis and other micro-economic methods of project evaluation in the context of the project cycle in developing countries. Emphasis will be placed on policy analysis and implementation practice, case studies of development projects, including those of non-governmental organizations.

INAF 5700 [0.5 credit] (formerly 46.570)
The Natural Ecosystem
Analyzes human involvement in the natural environment as a development ecosystem. Discusses how the environment continues to be modified and its long-term consequences due to rapid technological advances. Attention will be given to individual development projects including their political and social setting.

INAF 5701 [0.5 credit] (formerly 46.571)
Global Environmental Change: Human Implications
Global environmental change; its significance for societies, economies and international relations. Value systems underlying environmental discourse; political economy of the environment; sustainability and security. Environmental diplomacy and grassroots environmentalism. Regionalized impacts of pressures on natural environments; challenges of adaptation. (Also listed as GEOG 5005.)

INAF 5705 [0.5 credit] (formerly 46.575)
International Health, Social Policy and Planning
This course focuses on health, social policy and planning in developing countries. Topics covered will include primary health care, the role of government in health administration, social policy formation, expenditure analysis in health and social factors, and techniques of policy evaluation in these sectors.
Precludes additional credit for INAF 5409 (taken prior to 1997-98).

INAF 5800 [0.5 credit] (formerly 46.580)
Asia Pacific Economic and Political Relations
Addresses the evolving pattern of economic and political relations in the Asia-Pacific region. Topics will include security issues; trade and investment; and development cooperation. Particular consideration will be given to institutional arrangements, including ASEAN, APEC, AFTA and Canada's role in the regional affairs.

INAF 5801 [0.5 credit] (formerly 46.581)
Regional Cooperation Among Developing Countries
A comparative study of selected regional cooperation and integration schemes, including those in Africa, Asia, Latin America, and the Caribbean, as well as between higher and lower income countries.

INAF 5802 [0.5 credit] (formerly 46.582)
The International Political Economy of Transition
Problems of reintegration into the world economy and dilemmas of transition from command to market economies. Topics may include new trade and investment patterns, role in regional and international economic organizations, search for appropriate exchange rate policies, impact of Western assistance. (Also listed as EURR 5102.)

INAF 5804 [0.5 credit] (formerly 46.584)
International Relations in Europe
This course examines international relations and organizations in Europe from theoretical and historical perspectives. Topics discussed include the origins and development of European organizations such as the European Union and the Organization for Security and Co-operation in Europe.

INAF 5901 [0.5 credit] (formerly 46.591)
Tutorials in International Affairs
To be chosen in consultation with the director.

INAF 5905 [0.5 credit] (formerly 46.595)
Research Workshop
This seminar focuses on the special problems of research design in the interdisciplinary field of international affairs, with materials drawn from both the established literature and the practice of leading members of the School's faculty.

INAF 5907 [2.0 credits] (formerly 46.597)
Course Work Comprehensive in International Affairs
Required for students in a course work M.A. who by the third term in their M.A. program have not yet completed their comprehensive examination. Completion of this course does not reduce the formal requirement of 5.0 credits.

INAF 5908 (formerly 46.598)
Research Essay

INAF 5909 [2.0 credits] (formerly 46.599)
M.A. Thesis

Selection of Courses

In addition to the graduate courses offered in the School, qualified students may choose from among courses in international affairs offered by related departments, schools, and institutes.

Journalism and Communication

St. Patrick's Building 346
Telephone: (613) 520-7404
Fax: (613) 520-6690
E-mail: journalism@carleton.ca
Web site: www.carleton.ca/jmc

The School

Director of the School, Christopher Dornan

Supervisor of Graduate Studies (Journalism), C. McKercher

The School of Journalism and Communication offers courses leading to the degree of Master of Journalism. (For a description of the degrees of Master of Arts and Ph.D. in Communication, see the Mass Communication section of this Calendar.) The emphasis in the M.J. program is on advanced professional education for those who are or intend to become practising journalists in the news media. In practical terms, this entails both the polishing of professional journalistic skills to a high level of proficiency and advanced education in a related field of study. Provision is made also for students who wish to undertake research in journalism and mass media.

Following a common first year of professional coursework, students in the master's program will choose one of three areas of concentration in their second year of study:

Specialized Print Reporting
At present, specializations are offered in the fields of politics/public administration, international affairs, and economics/business. Others may be added as resources become available.

Broadcast Journalism
The focus of this specialty will be the study of advanced techniques in reporting, writing and producing programs for the broadcast media.

Journalism Studies
This program is designed for applicants who have mastered the skills of reporting and writing for the news media but who wish to spend a year studying their craft and/or the news industry. This specialty encompasses a number of topics, which include the role of the media in society as it is conceived by selected social and political theorists, communications law, politics and the media, the economics of the media, and journalism history.

Carleton's School of Journalism and Communication is uniquely situated for advanced journalism study. It offers ready access to many of the people and institutions that most directly influence Canadian affairs: Parliament, federal government departments and agencies, embassies, business and labour organizations, and major economic and cultural institutions.

Master of Journalism

Admission Requirements

The Master of Journalism program comprises 10.0 credits. Most applicants will be admitted to the First year of a two-year course of study, but some may qualify for admission directly to the Second year (see below). An admissions committee, including the supervisor of graduate studies, will determine the admissions qualifications of each applicant.

Admission will be selective. Admission will not be guaranteed to all who meet the published minimum requirements, as there are many more qualified applicants each year than there are available spaces.

A student who holds a bachelor's or master's degree from a recognized university in a field other than journalism may be admitted to the first year of study if he or she achieved at least high honours standing. Such students who complete the core first year, outlined below, and meet the requirements of the Faculty of Graduate Studies and Research, Section 11 of the General Regulations section of this Calendar, may proceed to Second year.

Applicants who have a three-year journalism degree with high honours standing may be admitted to a First year made up largely of approved courses from the Faculties of Arts and Social Sciences and Public Affairs and Management. Such students may proceed to the second year of study if they have achieved high honours standing.

A limited number of spaces will be made available for direct admission to the Second year of the M.J. program. Students must normally possess one of the following qualifications to be considered for this advanced admission: a B.J. (Honours) or the equivalent with high second-class standing, or a degree in another discipline from a recognized university plus at least five years of professional experience in journalism, or long and distinguished professional experience in journalism. Students with suitable professional qualifications but no degree may occasionally be admitted to a program in which they take a required number of undergraduate courses in addition to the M.J. program.

Application is made on forms available from the School of Journalism and Communication. Students applying for the first year of the program are advised to apply by June 1 as enrolment in the School is limited. All applications received after June 1 will normally be considered only for entry into the program in the year following.

As a condition for graduation, all students are required to have a minimum of four months of practical experience in the media, and a working knowledge of a second language, preferably French.

Program Requirements

First Year

Candidates admitted to the first year of the Master of Journalism program must complete the following courses before proceeding to the second year of study:

- JOUR 5000
- JOUR 5200
- JOUR 5202
- JOUR 5206
- JOUR 5208
- JOUR 5401
- 1.0 credit of approved electives

First year M.J. candidates may be considered for advanced standing in certain of the above-required courses, but in such cases will be required to replace waived courses with approved options.

Second Year

Credits will be determined according to the stream pursued:

Specialized Print Reporting

(i) JOUR 5508
(ii) JOUR 5700
(iii) JOUR 5701
(iv) JOUR 5706
(v) JOUR 5908
(vi) 1.0 credit of approved electives in the student's area of specialization

Note: Under special circumstances, and with the School's approval, a student could replace items (iv) and (v) and 0.5 credit elective in item (vi) above with a 2.0 credit M.J. Thesis, JOUR 5909.

Broadcast Journalism

(i) JOUR 5508
(ii) JOUR 5702
(iii) JOUR 5703
(iv) JOUR 5706
(v) JOUR 5908
(vi) 1.0 credit of approved electives in the student's area of specialization.

Note: Under special circumstances, and with the School's approval, a student could replace items (iv) and (v) and 0.5 credit elective in item (vi) above with a 2.0-credit thesis, JOUR 5909.

Journalism Studies

(i) JOUR 5000
(ii) JOUR 5500
(iii) JOUR 5909

(iv) 2.0 credits related to the study of the media, chosen in consultation with the Supervisor of Graduate Studies.

Academic Standing

All candidates are required to obtain a grade of B- or better in each credit in the program. A candidate may, with the recommendation of the School and the approval of the Dean of the Faculty of Graduate Studies and Research be allowed a grade of C+ in 1.0 credit.

Full-time students in a 10.0 credit M.J. program are advised that their thesis or research essay proposal must be formally approved within eighteen months of initial registration. Students in a 5.0 credit program must have the proposal formally approved by the middle of their second term of full-time registration. Due dates for part-time students will be adjusted accordingly. Students failing to file a proposal may not be permitted to register in subsequent terms until this requirement has been met. Approval of proposals shall be the responsibility of a thesis committee appointed by the Director of the School.

Students are advised to consult the General Regulations section of this Calendar for other regulations relating to academic standing.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

First Year

JOUR 5000 [0.5 credit] (formerly 28.500)
Journalism and Society I
An introduction to analysis of the news media in Western society, considering classical arguments and contemporary trends in the scholarly assessment of journalism practice.

JOUR 5200 [1.0 credit] (formerly 28.520)
Print Journalism Laboratory
A laboratory course in basic reporting and editing techniques, followed by application in the print media.

JOUR 5202 [1.0 credit] (formerly 28.522)
Broadcast Journalism Laboratory
A laboratory course in reporting and editing in
the broadcast media.

JOUR 5206 [0.5 credit] (formerly 28.526)
Reporting Methods
Topics covered will range from interviewing and
observation skills to conducting a title search,
lodging an access to information request and
interpreting data.

JOUR 5208 [0.5 credit] (formerly 28.528)
Public Affairs Reporting
A course devoted to understanding selected
political, economic and social issues, and to
analytical reporting on timely issues under
professional conditions.

JOUR 5305 [0.5 credit] (formerly 28.535)
Perspectives on Modern Society
A seminar course examining texts from the social
sciences, philosophy, literature, and journalism
for the contribution they make to. an
understanding of issues facing modern industrial
society.

JOUR 5401 [0.5 credit] (formerly 28.541)
Journalism Law
This course prepares journalists to function
comfortably within the legal and ethical
guidelines governing their occupation. Topics
include: contempt of court; free press, fair
trial; revealing of sources; civil defamation;
obscenity; privacy; government secrecy.

Second Year

JOUR 5500 [0.5 credit] (formerly 28.550)
Journalism and Society II
A critical examination of the conduct of the
news media, exploring the social, political and
economic contexts in which the media work
and assessing the consequences of journalism
practice for contemporary society.
Prerequisite: JOUR 5000 or permission of the
School.

JOUR 5508 [0.5 credit] (formerly 28.558)
Professional Practices: Specialized Media
A workshop course designed to give students
instruction in specialized areas such as radio
documentary, video documentary, film
documentary, editing, magazine writing,
photojournalism. Not all specialties will be
offered each year. Also offered at the
undergraduate level, with different
requirements, as JOUR 4208 for which
additional credit is precluded.

JOUR 5700 [1.0 credit] (formerly 28.570)
Advanced Reporting (Print)
Students will explore and apply advanced
journalistic principles and practices through a
combination of readings, discussion and
reporting in specific areas.

JOUR 5701 [1.0 credit] (formerly 28.571)
Reporting and Online Publishing
This course is designed to enhance reporting
and editing skills through online publishing of
electronic newspapers and/or newsmagazines.

JOUR 5702 [1.0 credit] (formerly 28.572)
Television Journalism
A seminar combining critical analysis of television
journalism and practical skill development in
television reporting, writing and production.

JOUR 5703 [1.0 credit] (formerly 28.573)
Advanced Reporting (Broadcasting)
Enhances television and radio reporting and
production skills to include news features and
mini-documentaries, preparation and
presentation of public affairs programs, and
multimedia delivery.

JOUR 5706 [0.5 credit] (formerly 28.576)
Professional Practices
Students examine current journalism practices
in a critical and analytical way, and explore
ways of producing thorough and investigative
journalism. Guest speakers share their expertise
and skills.

JOUR 5800 [0.5 credit] (formerly 28.580)
Survey Methods for Journalists
An examination of basic research design and
data collection with emphasis on problems of
interpretation.

JOUR 5808 [0.5 credit] (formerly 28.588)
Directed Readings
Students, working under faculty direction, will
undertake an intensive reading schedule in order
to pursue a subject area of particular interest.

JOUR 5809 [0.5 credit] (formerly 28.589)
Directed Research
Students, working under faculty direction, will
develop and undertake a research project in
order to pursue a subject area of particular interest.

JOUR 5900 [1.0 credit] (formerly 28.590)
Directed Studies
Reading and research tutorials.

JOUR 5901 [0.5 credit] (formerly 28.591)
Directed Studies
Reading and research tutorials.

JOUR 5908 [1.0 credit] (formerly 28.598)
M.J. Research Project
The student will complete a substantial piece of
public affairs journalism; or a research project
on the media; or a document that makes a
major contribution to journalism education. The
format of the MRP will be determined by the
stream of study.

JOUR 5909 [2.0 credits] (formerly 28.599)
M.J. Thesis
To fulfil the requirements of this 2.0-credit thesis
course, students must produce a major piece
of journalistic research or complete an academic
thesis in the area of journalism studies.

Law

Loeb Building C473
Telephone: (613) 520-3690
Fax: (613) 520-4467

The Department

Chair of the Department, Michael Mac Neil

Supervisor of Graduate Studies, Diana Majury

The Department of Law offers a program of advanced study and research leading to a Master of Arts degree in Legal Studies. The program is open to full-time and part-time students.

The Department also offers a Graduate Certificate in Conflict Resolution. Further information can be found at the end of this section. The M.A. program provides an interdisciplinary, theoretical, and research-oriented approach to studying law as a social and political institution, with emphasis on the relationship between law and social transformation. The plan of studies includes a range of fields linked by a common theoretical and methodological concern with the way law shapes and is shaped by its social environment. The program is designed to develop the conceptual and analytical skills required for conducting independent research on law and society.

Within this context, students will focus on one or more of the following areas of specialization:

- Legal Theory and Social Theory

- Law, Crime and Social Order

- Women, Law and Gender Relations

- Political Economy of Law

- International and Comparative Legal Regimes

- Social History of Law

The location of the M.A. program in Legal Studies at Carleton provides students with a wealth of resources for research purposes. As well as the resources of the MacOdrum Library, students will have access to extensive Canadian and international research material through the Social Science Data Archives located at Carleton. The Library of the Supreme Court of Canada, the National Library, the National Archives, the Library of Parliament, Statistics Canada, and the Centre for Justice Statistics are all located in Ottawa. Ottawa houses many federal government departments and agencies, as well as the national headquarters of non-governmental organizations such as the Elizabeth Fry Society, the John Howard Society, and the National Association of Women and the Law. Many government departments and non-governmental organizations maintain specialized libraries, and offer access to documents and other research materials.

Qualifying-Year Program

Applicants with exceptional promise who have less than B.A.(Honours) status may be admitted into a qualifying-year program designed to raise their standing to honours status. To be considered for admission into the master's program, students must obtain at least a high honours average in their qualifying-year courses.

Master of Arts

Admission Requirements

The requirement for admission into the M.A. program in Legal Studies is an Honours bachelor's degree or the equivalent, with at least high honours standing.

Applicants will be considered for admission on the basis of their academic background and standing. Where relevant, previous professional experience may be taken into account.

Applicants without a background in law may be required to complete one or more designated courses, including LAWS 3907: Legal Research Methods, from the department's undergraduate program before taking courses towards the master's degree.

The deadlines for submitting applications for graduate studies in the Legal Studies program are as follows: February 15 for students seeking financial assistance and June 1 for students not seeking financial assistance. If the program is able to consider applications for January admission, the applications are due November 1.

Program Requirements

In consultation with the supervisor of graduate studies, each candidate is required to complete the following program of studies:

- 3.0 credits

- A thesis equivalent to 2.0 credits and an oral examination

All students are required to take LAWS 5000 and LAWS 5001. These courses provide students with a common theoretical and interdisciplinary framework for the program. The methods course is designed to develop the link between the theoretical orientation and the important research component of the program. Rather than seeking to provide all possible research skills, the course focuses on the importance of methodological issues and choices in research design.

In addition, students are encouraged to take 0.5 credit in a related discipline, in consultation with the supervisor of graduate studies.

All students must obtain satisfactory grades in their course work; make satisfactory progress in their research; maintain a close working relationship with their thesis supervisors; and attend seminars on current research and related topics. Each student will be required from time to time to present a seminar on his/her research.

Thesis

The thesis must represent the result of the candidate's independent research undertaken after being admitted into graduate studies in the Department of Law. Previous work of the candidate may be used only as introductory or background material for the thesis.

A student may carry on research work related to the thesis off campus if the work is approved in advance and supervision arrangements have been made with the supervisor of graduate studies.

Guidelines for Completion of Master's Degree

Full-time students are expected to complete the required two courses, LAWS 5000 and LAWS 5001, and an additional 2.0 credits by the end of the second term of registration. The thesis proposal should be submitted by the end of the sixth week of the second term of study. The thesis should be submitted by the end of the fourth term of study.

Part-time students are expected to complete the required two courses, LAWS 5000 and LAWS 5001, and an additional 2.0 credits by the end of their third year of study. The thesis proposal should be submitted by the end of the second month of the fourth year of study. The thesis should be submitted by the end of the fifth year of study.

Certificate in Conflict Resolution

The Department of Law offers a program of advanced study leading to a Graduate Certificate in Conflict Resolution.

The Certificate provides an interdisciplinary program of study emphasizing theoretical models of conflict and its management and/or resolution, and integrating skills and techniques in the field. The program has an academic structure and a professional orientation, and is directed to individuals whose work involves negotiation or coping with conflict. The program develops in students an intellectual foundation and applied skills to enable them to function effectively in their field.

Interested students should contact the Department of Law for information concerning admission and program requirements, scheduled courses, and fee schedules.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Core Courses

The compulsory courses are designed to give substance to the major objectives of the program. They provide the theoretical and interdisciplinary framework which will set the terms of discussion and debate for the program. The courses are designated as compulsory because it is anticipated that students will be drawn from both law and social sciences backgrounds, and consequently there is a need to provide a central and shared basis for the whole program. The methods course is designed to develop the link between the theoretical orientation and the important research component of the program. Rather than seeking to provide all the research skills that students might require, the course focuses on the importance of methodological issues and choices in research design.

LAWS 5000 [0.5 credit] (formerly 51.500)
Theories of Law and Social Transformation
Examines three groups of theories of law (liberal, sociological and Marxist) focusing on different ways law is conceived as an object of inquiry and on different accounts of trajectories of legal development. Potential of law for realizing or inhibiting social change provides analytic framework.

LAWS 5001 [0.5 credit] (formerly 51.501)
Legal Method and Social Inquiry
Introduces problems of research strategy and methods. Explores contrasting methodologies in legal research; evaluates methodologies employed in understanding legal reasoning, discourses, and practices. Includes seminars in which participants present outlines of their own research projects, focusing on methodologies and research questions.

LAWS 5909 [2.0 credits] (formerly 51.599)
M.A. Thesis

Other Law Courses

LAWS 5002 [0.5 credit] (formerly 51.502)
Law and Gender Relations
Examines theoretical approaches informed by significance of gender to structure and operation of law. Concepts such as essentialism, difference, cultural determination, and social construction of gender relations examined in context of contemporary feminist debates. Focus on understanding and facility with feminist analysis and methodology.

LAWS 5003 [0.5 credit] (formerly 51.503)
Law, Economy and Society
Addresses the relationship between law, economy, and society. Competing theoretical accounts of the relationship between legal regulation and social and economic change explored through selected historical and contemporary case studies.

LAWS 5004 [0.5 credit] (formerly 51.504)
Law, Crime and Social Order
Examines theoretical dimensions of relationship between law, state, crime, and social order. Explores scope and limitations of criminal justice system as an agency of social control. Examines shifts in forms of social order and their relation to changes in criminal law and sanctions.

LAWS 5005 [0.5 credit] (formerly 51.505)
Law, State and Politics
Examines theoretical explanations of relationships between law, state and politics, Selected areas such as rights theory, rule of law, separation of powers or judicial review may provide focus.

LAWS 5006 [0.5 credit] (formerly 51.506)
Historical Perspectives on Law and Society
Examines historical relationship between social forces, law and legal institutions and utility of historical forms of knowledge and methods to legal studies. Surveys selected issues in private, public and criminal law.

LAWS 5007 [0.5 credit] (formerly 51.507)
Race, Ethnicity and the Law
Examines ways race and racism interact with gender and class in shaping legal system. Explores ways legal system institutionalizes racism and potential for using the legal system to combat racism. Selected areas such as immigration law and native rights may be used to illustrate themes.

LAWS 5008 [0.5 credit] (formerly 51.508)
Consuming Passions: The Regulation of Consumption, Appearance and Sexuality
Examines rise of consumption and private pleasures and their regulation and self-regulation. Social history of regulation of two fields of consumption: surfaces of the person:
personal appearance, in particular of dress, the body, sexuality; and intakes of the body, focusing on food, alcohol, drugs. (Also listed as SOCI 5204.)

LAWS 5100 [0.5 credit] (formerly 51.510)
Advanced Problems in Legal Philosophy
Studies in legal theory and analyses of law advanced by Hart, Dworkin, and others, and legal concepts: for example, principles, rights, duties, liability, etc. Precise course content will vary from year to year and will be announced at the beginning of the term. (Also listed as PHIL 5100.)
Prerequisites: Either LAWS 3105 or LAWS 3101 (PHIL 3101) and LAWS 3102 (PHIL 3102), or permission of the Department.

LAWS 5200 [0.5 credit] (formerly 51.520)
International Economic Law: Regulation of Trade and Investment
Study of regulation of international economic activity. Discussion of relevant international institutions, legal aspects of integration, governmental regulation of trade and investment. (Also listed as INAF 5507.)
Prerequisite: Open only to students in their master's year who have not studied international economic law.

LAWS 5302 [0.5 credit] (formerly 51.532)
Feminism, Law and Social Transformation
Exploration of nature and possibilities of feminist engagement with law. Policies and strategies of law reform and/or social transformation formulated and evaluated through application of theoretical frameworks to particular topics. Significance of *Canadian Charter of Rights and Freedoms* and human rights legislation is examined.

LAWS 5305 [0.5 credit] (formerly 51.535)
Crime, Social Change and Criminal Law Reform
Examination of the ideological and practical consequences of criminal law reform and policy initiatives undertaken by the state. Specific reform proposals examined to illustrate possible alternate responses to social problems and the varying effects of these responses.

LAWS 5400 [0.5 credit] (formerly 51.540)
Law, Economy and the Regulatory Process
Relationship between law, the economy, and the regulatory process. Examines models from political and economic perspectives, and impact of theories of regulation on regulatory practice and enforcement. Selected topics may be drawn from labour law, housing and consumer protection, environmental protection, and anti-combines legislation.

LAWS 5405 [0.5 credit] (formerly 51.545)
Canadian Labour Law Policy from a Comparative Perspective
Examines major influences on formation of Canadian labour law policy using a comparative

perspective to highlight divergencies in Western democratic nations. Question if and why Canadian labour law is distinctive. Includes collective bargaining and regulation of individual employment relationships.

LAWS 5500 [0.5 credit] (formerly 51.550)
The Canadian Constitution
Familiarizes students with terminology, principles, and doctrines of judicial interpretation of Constitution Acts 1867-1982 and other constitutional statutes. Emphasis on division of legislative powers in the Canadian federation.
Prerequisite: Open only to graduate students in their master's year who have not previously studied Canadian constitutional law.

LAWS 5503 [0.5 credit] (formerly 51.553)
Advanced Legal Problems of Federalism
An advanced study of selected Canadian constitutional problems including constitutional revision. Some comparisons with other federal systems may be made.
Prerequisite: A course in Canadian constitutional law, for example LAWS 5500, or permission of the Department.

LAWS 5506 [0.5 credit] (formerly 51.556)
Advanced Administrative Law Problems
An in-depth study of selected legal questions involving the activities of public authorities.
Prerequisite: A course in administrative law or permission of the Department.

LAWS 5603 [0.5 credit] (formerly 51.563)
International Law: Theory and Practice
Examines various theoretical perspectives on international law and locates role international law plays in the international system. Topics include basis, creation and sources of international law, international dispute resolution, and international law and world order transformation. (Also listed as INAF 5505.)

LAWS 5900 [0.5 credit] (formerly 51.590)
Tutorials/Directed Readings in Law
Tutorials or directed readings in selected areas of law, involving presentation of papers as the basis for discussion with the tutor.

LAWS 5901 [0.5 credit] (formerly 51.591)
Tutorial/Directed Readings in Law
Tutorials or directed readings in selected areas of law, involving presentation of papers as the basis for discussion with the tutor.

LAWS 5903 [0.5 credit] (formerly 51.593)
Contemporary Topics in Legal Studies
A research seminar which explores a selected topic from current debates in legal studies. Students should check with the Department regarding the topic offered.

LAWS 5904 [0.5 credit] (formerly 51.594)
Contemporary Topics in Legal Studies
A research seminar which explores a selected topic from current debates in legal studies.

Selection of Courses in Related Disciplines

In addition to the graduate courses offered by the Department of Law, students in the M.A. program are encouraged to take 0.5 credit in a related discipline, in consultation with the supervisor of graduate studies. Listed below are courses offered by other academic units that can be taken towards the requirements of the M.A. in Legal Studies. This list is not exhaustive and is subject to change.

In certain circumstances (with the approval of the supervisor of graduate studies) up to 1.0 credit may be selected from among those offered at the 4000-level.

Note: Students should be aware that the number of spaces in graduate courses offered by other departments may be limited, and that registration may be conditional upon obtaining the prior approval of the department concerned. It is the student's responsibility to ensure that permission is obtained from the appropriate department prior to registering in any of the department's courses.

Students are advised that there is no guarantee that all of these courses will be offered in any given year, or in any given term. 1.0 credit courses are scheduled over two terms and students interested in these courses must consult the graduate supervisor. Students should check the current University timetable to ensure course availability and schedule when planning their program.

Canadian Studies
CDNS 5100, CDNS 5200, CDNS 5201

Economics
ECON 5302, ECON 5303, ECON 5308, ECON 5403

Geography
GEOG 5400, GEOG 5401, GEOG 5404

History
HIST 5206, HIST 5300, HIST 5509, HIST 5808

International Affairs
INAF 5203, INAF 5306, INAF 5100, INAF 5305, INAF 5402, INAF 5405, INAF 5505, INAF 5507, INAF 5808

Journalism and Communication
JOUR 5401

Political Science
PSCI 5100, PSCI 5507, PSCI 5509

Psychology
PSYC 5104, PSYC 5107, PSYC 5202

Public Administration
PADM 5002, PADM 5203, PADM 5306, PADM 5607, PADM 5608, PADM 5609, PADM 5804

Sociology and Anthropology
SOCI 5206, SOCI 5300, SOCI 5302, SOCI 5306,
SOCI 5308, SOCI 5400, SOCI 5404, SOCI 5405,
SOCI 5408, SOCI 5409, SOCI 5504, SOCI 5600,
SOCI 5607, SOCI 5608, SOCI 5707

Social Work
SOWK 5101, SOWK 5106, SOWK 5301, SOWK
5302, SOWK 5704

Linguistics and Applied Language Studies

Paterson Hall 249
Telephone: (613) 520-2802
Fax: (613) 520-6641
E-mail: linguistics@carleton.ca
Web site: www.carleton.ca/slals

The School

Director, To be announced

Supervisor of Graduate Studies, Devon Woods

The School of Linguistics and Applied Language Studies offers programs of study leading to the degree of Master of Arts in Applied Language Studies. Applied language studies may be distinguished by their focus on language learning, especially the acquisition of literacy and/or second languages, in a variety of contexts.

The program is geared largely towards practitioners in the field, and is aimed at enhancing their understanding of:

- discourse processes and social contexts for language use

- first and/or second language acquisition and development

- educational contexts for and testing of such acquisition

Concentration is possible in one of the following three fields:

- English as a second language

- the acquisition and development of writing abilities

- adult literacy

In addition, individual programs may be drawn up for students who are interested in the connection among any of these three fields.

Additional information may be obtained by consulting the supervisor of graduate studies.

Qualifying-Year Program

Applicants who hold a three-year degree with honours standing (at least B overall) may be admitted to the qualifying-year program. Normally, these students will be required to complete 5.0 credits in accordance with the advice of the graduate supervisor. At the end of the qualifying-year program, the School will determine the student's eligibility to enter the master's program.

Master of Arts

Admission Requirements

The normal requirement for admission to the master's program is a B.A.(Honours) degree in a discipline involving the analysis of language or the study of language use or learning; or a 3 year B.A. in a relevant discipline together with a B.Ed. or C.T.E.S.L. Students must have achieved high honours standing (at least B+ in related courses and B- overall) in their academic work. Relevant professional experience is also seriously considered in admissions decisions. In some cases substantial professional experience and related professional development may be accepted as an alternative to certain formal academic work. Students whose previous studies include little work relevant to applied language studies may be required to take up to two additional 1.0 credit courses for the master's degree.

Program Requirements

Students will establish their programs in consultation with an adviser from the School.

Each candidate will select one of the following program paths:

- LALS 5502; LALS 5001; plus 2.0 credits from the School's graduate listing; and a master's thesis (LALS 5909).

- LALS 5502; LALS 5001; plus 3.0 credits from the School's graduate listing; and a research essay (LALS 5908).

- LALS 5502; LALS 5001; plus 4.0 credits from the School's graduate listing.

The choice of thesis, research essay, or credit program path will be made by the student, with the advice of the Supervisor. Relevant factors will include the student's academic goals, professional goals, and background knowledge.

LALS 5001 is normally to be taken in the first fall term after admission to the program.

Permission may be granted for enrolment in 1.0 credit offered in another department.

Graduate students may take the equivalent of 1.0 full credit at the senior undergraduate level, with the permission of the School adviser.

Guidelines for Completion of Master's Degree

It is expected that students will progress steadily towards the completion of requirements for the degree. In particular, it is normally expected that:

- a full-time student will complete 3.0 credits of course work within two terms of study, and an acceptable thesis proposal early in the third term of study; or 4.0 credits of course work within three terms, and an acceptable research essay proposal early in the fourth term; and all degree requirements within six terms of study

- a part-time student will complete 3.0 credits of course work within three years of initial registration, and an acceptable thesis proposal early in the fourth year; or 4.0 credits of course work within four years, and an acceptable research essay proposal early in the fifth year; and all degree requirements within six years of initial registration

- a student who registers in a combination of full-time and part-time study will, in consultation with an adviser, develop a schedule for completion of course requirements and a thesis or research essay proposal, consistent with times to completion stated above and with the overall time limits specified in the General Regulations section in this Calendar

Academic Standing

A standing of B- or better must be obtained in each credit counted towards the master's degree.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

LALS 5001 [0.5 credit] (formerly 29.501)
Directions in Applied Language Studies
A survey of current research directions in applied language studies and an introduction to ongoing research in the School. The course introduces students to the scope of theory and practice in the field.

LALS 5201 [0.5 credit] (formerly 29.521)
Language Classroom Research
Research into language learning in the classroom; methods for evaluating classroom practices and materials.

LALS 5202 [0.5 credit] (formerly 29.522)
Curriculum Design in ESL
Current theory and practice in ESL curriculum design in the light of recent research in linguistics, psycholinguistics, sociolinguistics, and language acquisition studies.

LALS 5203 [0.5 credit] (formerly 29.523)
Issues in English Language Teaching/Teacher Education
A research seminar to explore current issues in English language teaching/teacher education.

LALS 5401 [0.5 credit] (formerly 29.541)
Rhetoric and Argument in the Human, Social and Natural Sciences
The degree to which rhetorical considerations shape the construction of arguments within disciplinary communities. How disciplinary and socio-historical conditions shape scientific communities' criteria for what is accepted as persuasive. Also offered at the undergraduate level, with different requirements, as LALS 4401, for which additional credit is precluded.

LALS 5402 [0.5 credit] (formerly 29.542)
Learning Across the Disciplines: A Research Practicum
For practising teachers or graduate student teachers, or tutors. Theories about and research into the role of language in learning and pedagogic situations which optimize that relationship. Also offered at the undergraduate level, with different requirements, as LALS 4402, for which additional credit is precluded.

LALS 5403 [0.5 credit] (formerly 29.543)
Language in the Classroom
Learning through language; studies of the use of language (as a resource for education) in the classroom; methods for evaluating the effectiveness of classroom discourse practices.

LALS 5405 [0.5 credit] (formerly 29.545)
Written Language, Representation and Cognition
Language and thought; social formation of mind and language; written and spoken discourse compared; models and taxonomies of written discourse; modes (narrative, exposition, argument) in traditional rhetoric and contemporary research; concepts of function and levels of abstracting.
Precludes additional credit for LALS 5603 (taken prior to 1997-98).

LALS 5501 [0.5 credit] (formerly 29.551)
Language Testing
Methods for the development of tests; analytic techniques, including classical and IRT methods; research in test-taking and test evaluation.

LALS 5502 [0.5 credit] (formerly 29.552)
Inquiry Strategies in Applied Language Studies
A consideration of various approaches to the design of studies and the collection and analysis of data. Naturalistic and quasi-experimental

methods will be discussed. The role of statistics in disciplined inquiry, including an introduction to elementary procedures.

LALS 5504 [0.5 credit] (formerly 29.554)
Evaluation in Applied Language Programs
An examination of various evaluation paradigms and their application to problems of program and curriculum in applied language settings; the connections among and differences between research and evaluation models of inquiry.

LALS 5508 [0.5 credit] (formerly 29.558)
Critical Applied Linguistics
Approaches and methods of critical applied linguistics, including historical analysis, accounts and narratives, and discourse analysis. Application to areas such as language and gender, language in education and language policy.
Prerequisite: Honours courses in linguistics or permission of the School.

LALS 5601 [0.5 credit] (formerly 29.561)
Language Acquisition
Current models of first and second language acquisition, with emphasis on empirical studies. Also offered at the undergraduate level, with different requirements, as LALS 4602, for which additional credit is precluded.

LALS 5604 [0.5 credit] (formerly 29.564)
Aspects of Language Development
Empirical study of the development of syntax and the expansion of communicative competence during the years of formal education; pedagogical implications.

LALS 5605 [0.5 credit] (formerly 29.565)
Writing Research and Theory: Overview of Recent and Current Approaches
Overview of trends and directions in composition research and theory since the 1970s, from the reinvention of rhetorical theory, to the application of cognitive models in research on composing, and the more recent importation of social constructivist paradigms.

LALS 5606 [0.5 credit] (formerly 29.566)
Adult Literacy Acquisition
Studies of adult literacy learners; theories of adult learning; relations between literacy and other linguistic abilities; pedagogical implications.

LALS 5701 [0.5 credit] (formerly 29.571)
Aspects of Bilingualism
Aspects of the psycholinguistics and sociolinguistics of bilingualism.
Prerequisite: Honours courses in linguistics or permission of the School.

LALS 5703 [0.5 credit] (formerly 29.573)
Academic and Workplace Genres
Overview of current reconceptualizations of genre as social action; recent research into the nature of school-based, professional, and workplace discourse; issues relating to genre acquisition and pedagogy.

LALS 5704 [0.5 credit] (formerly 29.574)
Research in Adult Literacy
Studies in adult reading; methods of identifying adult reading needs; sociolinguistics of adult reading.

LALS 5705 [0.5 credit] (formerly 29.575)
Second Language Writing: Research and Theory
Second language writing: research, theory, and pedagogy.

LALS 5706 [0.5 credit] (formerly 29.576)
Writing Research and Theory: Social and Cultural Dimensions
Recent research in the social and cultural dimensions of learning to read and write; the uses and impact of written discourse in social contexts; writing in modern societies; the impact of electronic technology.
Precludes additional credit for LALS 5702 (taken prior to 1997-98).

LALS 5707 [0.5 credit] (formerly 29.577)
Language Policy and Planning
Analysis of interaction of political, social and cultural factors in the planning and implementation of language policy, with particular emphasis on the case of English in a selection of socio-political contexts.
Prerequisite: Honours courses in linguistics or permission of the School.

LALS 5902 [0.5 credit] (formerly 29.592)
Tutorial in Applied Language Studies
A one-term tutorial to study applications of linguistics in such areas as first-language education and second-language teaching.

LALS 5905 [0.5 credit] (formerly 29.595)
Special Topics in Applied Language Studies
Exploration of a topic from current research in applied language studies. Students should check with the School regarding the topic addressed in any term.

LALS 5907 [1.0 credit] (formerly 29.597)
Tutorial in Applied Language Studies
A two-term tutorial to study applications of linguistics in such areas as first-language education and second-language teaching.

LALS 5908 [1.0 credit] (formerly 29.598)
Research Essay

LALS 5909 [2.0 credits] (formerly 29.599)
M.A. Thesis

Mass Communication

St. Patrick's Building 310
Telephone: (613) 520-7408
Fax: (613) 520-6690
Web site: www.carleton.ca/jmc

The Program

Acting Associate Director, Paul Attallah

Supervisor of Graduate Studies, Ross Eaman

Master of Arts

The Mass Communication program of the School of Journalism and Communication offers a program of studies leading to a Master of Arts degree in Communication. Courses covering four areas of concentration are offered:

- the history of communication and media systems

- communication/information technologies and society

- communication and social relations

- communication policy and political economy

Additional information may be obtained by consulting the supervisor of graduate studies.

Qualifying-Year Program

Applicants who lack an Honours degree but who have a 3-year degree with honours standing (a minimum B standing overall) may be considered for admission to a qualifying-year program. Students who complete the qualifying year with high honours standing may be considered for admission to the master's program in the following year. Refer to the General Regulations section of this Calendar for regulations governing the qualifying year.

Admission Requirements

The minimum requirement for admission to the master's program is a B.A.(Honours) degree or the equivalent, with high honours standing in communication or a related discipline. Related disciplines may include sociology, political science, film studies, and Canadian studies.

Applicants without a background in communication studies may be required to take certain designated courses from the undergraduate mass communication program in addition to their regular program.

Possession of the minimum entrance standing is not in itself, however, an assurance of admission into the program.

Program Requirements

Each student, in consultation with the supervisor of graduate studies, will be required to follow a thesis or a non-thesis program for a total of 5.0 credits. Two of the four areas of concentration must be chosen.

In selecting their program of studies, all students will be required to take MCOM 5101. Students may take one optional course (1.0 credit) outside the program, with permission of the supervisor of graduate studies.

All master's students are required to complete:

- MCOM 5101

- 1.0 credit selected from: MCOM 5201, MCOM 5203, MCOM 5205, MCOM 5301

- a thesis (2.0 credits) and 1.0 credit from the list of optional courses below, or a research essay (1.0 credit) and 2.0 credits chosen from the list of optional courses

Optional Courses

- MCOM 5505
- MCOM 5506
- MCOM 5507
- MCOM 5508
- MCOM 5509
- MCOM 5605
- MCOM 5809
- MCOM 5900

Note: Students may take up to 1.0 credit outside the program with permission of the supervisor of graduate studies.

Academic Standing

A standing of B- or better must be obtained in each credit counted towards the master's degree.

Doctor of Philosophy

The School of Journalism and Communication offers a program of studies leading to the Doctor of Philosophy degree in Communication. The program focuses on three fields of concentration:

- The history of communication

- The political economy of communication

- The socio-cultural analysis of communication

Admission Requirements

The normal requirement for admission into the doctoral program is a master's degree (or the equivalent) in communication or a cognate field such as journalism studies, with an overall average of B+ or better.

Applicants who have deficiencies in certain areas may be admitted to the Ph.D. Program, but will normally be required to complete additional course work.

Program Requirements

Doctoral candidates must successfully complete the equivalent of 10.0 credits. The specific requirements are as follows:

- MCOM 6000 (1.0 credit)
- 2.0 additional credits from the list of optional courses below; up to 1.0 credit may be taken in a relevant discipline outside of the School
- Comprehensive examinations (2.0 credits)
- A thesis (5.0 credits) which must be defended at an oral examination
- A language requirement as stated below

Optional Courses

All doctoral candidates must complete 2.0 credits of optional courses from the list of approved options below. Students are encouraged to take up to 1.0 credit from courses offered in other departments, particularly those that address central theoretical and/or methodological issues within the student's chosen field of concentration. Students are also encouraged to choose directed readings/research courses with the core faculty of the program.

- MCOM 5201
- MCOM 5203
- MCOM 5205
- MCOM 5301
- MCOM 5505
- MCOM 5506
- MCOM 5507
- MCOM 5508
- MCOM 5509
- JOUR 5401
- JOUR 5500

Comprehensive Examinations

Once doctoral candidates have successfully completed all course requirements, maintaining a GPA of 9.0 or better, they will proceed to the comprehensive examinations. The comprehensive requirement normally consists of two examinations equivalent to 2.0 credits. Both examinations must be completed no later than two years or six terms after initial full-time registration, or four years or 12 terms after initial part-time registration. Students who do not fulfil this requirement may be asked to withdraw from the program.

The first examination tests the student's mastery of the theoretical, methodological and substantive issues of the discipline as a whole. Students complete a written examination, covering all three fields of specialization in the program, which will be determined and graded by the instructors of MCOM 6000. Submission of the written examination is followed by a comprehensive oral examination, which is not restricted to issues raised by the written portion. Students who fail the examination will normally be asked to withdraw from the program.

The second examination tests the student's knowledge of one field of specialization. The student normally will write answers to a set of field questions and will defend these answers before the student's advisory committee.

Language Requirement

Students are required to demonstrate an understanding of a language other than English, preferably French. Language testing will be administered by the School and will normally include a demonstration of reasonable understanding, on sight, of material contained in selected samples of scholarly literature in a foreign language and in the field of communication.

Thesis Requirement

A thesis proposal is presented after the comprehensive requirement has been satisfied, and defended at an oral presentation. The thesis, normally equivalent to 5.0 credits, must be successfully defended at an oral examination.

Academic Standing

A standing of B- or better must be obtained in each course counted towards the Ph.D. Degree. Students are advised to consult the General Regulations section of the Graduate Calendar for details of regulations governing graduate programs.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

MCOM 5101 [1.0 credit] (formerly 27.511)
Foundations of Communication Studies
This course undertakes an examination of the historical emergence of communication studies. It deals with the methodological debates that have occurred between various schools over the competing definitions of communication, and over the broader question of the centrality of communication to society.

MCOM 5201 [0.5 credit] (formerly 27.521)
Communication and History
A historical examination of the institutions, practices, and media of communication in various social milieux.

MCOM 5203 [0.5 credit] (formerly 27.523)
Communication Technology and Society
The course examines the social and cultural significance of communication and information technology (e.g., computers, television, telecommunication). It examines how these technologies influence and are influenced by major social institutions (e.g., business, government, entertainment) and by cultural practices.

MCOM 5205 [0.5 credit] (formerly 27.525)
Communication and Social Relations
This course studies how communication practices reproduce relations of inclusion and exclusion. It explores theoretical contributions to notions of public sphere, civil society, and citizenship. These issues are examined at the transnational level and are studied by looking at Orientalism and globalism.

MCOM 5301 [0.5 credit] (formerly 27.531)
Communication Institutions, Cultural Industries and State Policy
This course introduces various approaches to understanding communication policy and the political economy of communication. The course focuses on recent transformations in the communication industries, the impact of new technology, and changes in how governments intervene in the communications field.

MCOM 5505 [0.5 credit] (formerly 27.555)
Communication Media
A research seminar which focuses critically upon one of the communication media (such as radio, television, film, telecommunications, publishing, etc.) with a view to understanding its history, forms and genres, and social uses.

MCOM 5506 [0.5 credit] (formerly 27.556)
Transnational Communication
This course explores communication in a global context. It looks at the New World Information and Communication Order debate, structures and regulation of transborder communication, and broadcasting and news flows. Resistance to cultural imperialism and the emergence of diasporic networks of communication are also studied.

MCOM 5507 [0.5 credit] (formerly 27.557)
History of Canadian Broadcasting
A topical and thematic examination of selected aspects of the history of Canadian broadcasting, such as structure, regulation, technology, commercialism, social impact, audience research, and areas of programming such as drama, news, political and controversial broadcasts, and Northern broadcasting.

MCOM 5508 [0.5 credit] (formerly 27.558)
Mass, Public, Audience
This course examines the emergence and evolution of conceptions of modern social organization through the key concepts of mass, public, and audience. It looks at how shifts in the understanding of social organization occur, how these shifts are theorized, and the implications for communication study.

MCOM 5509 [0.5 credit] (formerly 27.559)
Media, Culture and Gender
This course examines the various theoretical positions that underlie the debates on the production and reproduction of gender relations through communication processes and communication institutions. It addresses current research issues in the feminist debates on culture and communication.

MCOM 5605 [0.5 credit] (formerly 27.565)
Special Topics in Communication Research
The course considers a variety of research protocols and procedures which may include: research organization; documentary research techniques; strategies in textual analysis, including content analysis and thematic analysis; qualitative techniques, including interviewing, observation, and ethnography; quantitative methods, including questionnaires, coding procedures, and statistical analysis.

MCOM 5809 [0.5 credit] (formerly 27.589)
Directed Research
The student, working under faculty direction, will develop and undertake a research project in order to study a particular subject area.

MCOM 5900 [0.5 credit] (formerly 27.590)
Directed Studies
Tutorials or directed readings in selected areas of communication. The student will present papers as the basis for discussion with the tutor.

MCOM 5908 [1.0 credit] (formerly 27.598)
Research Essay

MCOM 5909 [2.0 credits] (formerly 27.599)
M.A. Thesis

MCOM 6000 [1.0 credit] (formerly 27.600)
Doctoral Seminar in Communication Studies
The course examines major schools of thought in the field and leading theoretical and methodological debates, with an emphasis on the three fields of concentration in the program: the history of communication, the political economy of communication, and the socio-cultural analysis of communication.

MCOM 6001 [0.5 credit] (formerly 27.601)
Selected Topics in Communication
A seminar offered from time to time in one of the three fields of concentration.

Representation and Power. A research seminar on the politicized construction of social images and memories through diverse representational practices in a variety of media technologies.

Fragmentation and Reconstruction of the Audience. This course examines the role of such key concepts as mass, audience, fragmentation, public in the development of communication theory.

MCOM 6002 [0.5 credit] (formerly 27.602)
Tutorial in Communication
A tutorial in one of the fields of concentration of the program.

MCOM 6003 [0.5 credit] (formerly 27.603)
Directed Research
The student, working under faculty direction, will develop and undertake a research project in order to study a particular subject area.

MCOM 6004 [0.5 credit] (formerly 27.604)
Directed Studies
Directed readings in selected areas of communication. The student will present papers as the basis for discussion with the tutor.

MCOM 6900 [1.0 credit] (formerly 27.690)
Ph.D. Tutorial
A tutorial specifically designed as preparation for the first or breadth comprehensive examination, under the direction of two or more faculty members. The grade to be awarded will be that obtained on both the written examination and the oral defense.

MCOM 6901 [1.0 credit] (formerly 27.691)
Ph.D. Tutorial
Working under the direction of three or more faculty members, the selected tutorial provides preparation for the second or depth comprehensive examination. The grade to be awarded is that obtained in the second comprehensive examination.

MCOM 6909 [5.0 credits] (formerly 27.699)
Ph.D. Thesis
Selection of Courses in Related Disciplines

In addition to courses offered by the Mass Communication program, the following courses may, with the prior approval of the supervisor of graduate studies, be used to complete program requirements. This list is not exclusive and is subject to change. Students should be aware that enrolment in these courses may be limited and that registration may be conditional upon obtaining prior approval of the department concerned.

Note: It is the responsibility of the student to ensure that permission is obtained from the appropriate department prior to registering in any of the department's courses.

Canadian Studies
CDNS 5100, CDNS 5200, CDNS 5300

Economics
ECON 5303

Geography
GEOG 5403

Journalism and Communication
JOUR 5000, JOUR 5500

Political Economy
PECO 5000, PECO 5001

Political Science
PSCI 4003

PSCI 5004, PSCI 5401

Sociology
SOCI 5205, SOCI 5306, SOCI 5308, SOCI 5309, SOCI 5504, SOCI 5505

Ottawa-Carleton Institute of Mathematics and Statistics

Université d'Ottawa
University of Ottawa

Carleton University

Herzberg Building 4314
Telephone: (613) 520-2152
Fax: (613) 520-3536
E-mail: mathstat@carleton.ca
Web site: www.mathstat.carleton.ca
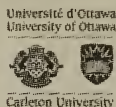
The Institute

Director of the Institute, Sam Melkonian

Associate Director, Philip Scott

Students pursuing studies in pure mathematics, applied mathematics, probability and statistics at the graduate level leading to a M.Sc. or a Ph.D. degree do so in a joint program offered by the School of Mathematics and Statistics at Carleton University and the Department of Mathematics and Statistics at the University of Ottawa under the auspices of the Ottawa-Carleton Institute of Mathematics and Statistics. The Institute is responsible for supervising the programs, regulations, and student admissions, as well as providing a framework for interaction between the two departments at the research level.

The list below of all members of the Institute along with their research interests can be used as a guide to possible supervisors.

In addition to the programs administered by the Institute, the School of Mathematics and Statistics at Carleton University offers several other programs.

In cooperation with the Department of Epidemiology and Community Medicine at the University of Ottawa, students may pursue a program leading to an M.Sc. with a Specialization in Biostatistics. For information, see the Ottawa-Carleton Collaborative Program in Biostatistic's section in this Calendar.

In cooperation with the Department of Systems and Computer Engineering and the School of Computer Science at Carleton University, students may pursue a program leading to an M.Sc. in Information and Systems Science. For information see the Information and Systems Science section of this Calendar.

Requests for information and completed applications should be sent to the Director or Associate Director of the Institute.

Members of the Institute

The home department of each member of the Institute is indicated by (C) for the School of Mathematics and Statistics, Carleton University and (UO) for the Department of Mathematics and Statistics, University of Ottawa.

- Mayer Alvo, *Nonparametric Statistics, Sequential Analysis* (UO)
- David Amundsen, *Nonlinear Wave Equations, Numerical Analysis* (C)
- Nick Barrowman, *Biostatistics, Applied Statistics* (C)
- Y. Billig, *Algebra* (C)
- R. Blute, *Logic, Category Theory* (UO)
- Amitava Bose, *Stochastic Modeling, Probability Theory* (C)
- Y. Bourgault, *Numerical Methods, Mathematical Modeling* (UO)
- S. Boyd, *Combinatorial Optimization, Algorithm Design and Analysis, Graph Theory, Polyhedral Combinatorics* (UO)
- W.D. Burgess, *Algebra, Non-Commutative Rings* (UO)
- Charles Castonguay, *Demography* (UO)
- Miklós Csörgő, *Probability and Statistics* (C)
- A.R. Dabrowski, *Invariance Principles, Weakly Dependent Variables* (UO)
- Daniel Daigle, *Algebraic Geometry, Commutative Algebra* (UO)
- D.A. Dawson, *Stochastic Processes and Probability Theory* (C)
- Benoit Dionne, *Ordinary Differential Equations, Bifurcation Theory* (UO)
- J.D. Dixon, *Group Theory, Algebra Computation* (C)
- Vlastimil Dlab, *Finite Dimensional Algebras, Representation Theory* (C)
- Kokou Dossou, *Numerical Solution of Partial Differential Equations of Mathematical Physics* (C)
- P. Farrell, *Sampling, Discrete Data, Applied Statistics* (C)
- Che-Kao Fong, *Operator Theory* (C)
- Zhicheng Gao, *Graph Theory* (C)
- C.W.L. Garner, *Foundations of Geometry* (C)
- Thierry Giordano, *Operator Algebras, Ergodic Theory* (UO)
- D.E. Handelman, *K-theory, Operator Algebras, Ring Theory* (UO)
- Roger Herz-Fischler, *History and Sociology of Mathematics* (C)
- B.G. Ivanoff, *Probability, Point Processes, Martingales* (UO).

- W. Jaworski, *Analysis, Probability* (C)

- Barry Jessup, *Rational Homotopy* (UO)

- Alexander Kitaev, *Isomonodromy Deformations, Painleve Equations* (C)

- Daniel Krewski, *Applied Statistics in Medicine* (C)

- E.O. Kreyszig, *Partial Differential Equations, Numerical Analysis* (C)

- V. LeBlanc, *Dynamical Systems, Bifurcation Theory, Mathematical Cosmology* (UO)

- J. Levy, *Lie Groups* (UO)

- I.A. Manji, *Homological Methods in Commutative Algebra and Algebraic Geometry, Cryptography* (C)

- D.R. McDonald, *Applied Probability* (UO)

- Sam Melkonian, *Non-linear Differential Equations* (C)

- S.E. Mills, *Applied Statistics, Statistical Methods, Inference* (C)

- A.B. Mingarelli, *Ordinary Differential Equations, Difference Equations* (C)

- M. Mojirsheibani, *Resampling, Classification and Pattern Recognition* (C)

- B.C. Mortimer, *Group Theory, Coding Theory* (C)

- Erhard Neher, *Jordan Algebras* (UO)

- D. Panario, *Finite Fields, Combinatorics, Analysis of Algorithms* (C)

- J.N. Pandey, *Generalized Functions, Partial Differential Equations* (C)

- J.C. Poland, *Group Theory* (C)

- I.S. Pressman, *Optimization, Algebra* (C)

- Michel Racine, *Jordan Algebras* (UO)

- Mizanur Rahman, *Special Functions* (C)

- J.N.K. Rao, *Sample Surveys Theory and Methods* (C)

- P. Révész, *Probability* (CU)

- Luis Ribes, *Group Theory* (C)

- R.B. Richter, *Graph Theory, Combinatorics* (C)

- Ivan Rival, *Combinatorics, Algorithms* (UO)

- Wulf Rossmann, *Lie Groups* (UO)

- Damien Roy, *Number Theory* (UO)

- A.K. Md. E. Saleh, *Order Statistics, Mathematical Statistics* (C)

- Matias Salibian-Barrera, *Robust Inference, Resampling Methods* (C)

- P. Sawyer, *Differential Geometry* (UO)

- P.J. Scott, *Logic, Category Theory* (UO)

- A. Singh, *Statistics* (C)

- Brett Stevens, *Combinatorics* (C)

- I. Stojmenovic, *Discrete Mathematics, Combinatorial Algorithms, Multiple-Value Logic, Theoretical Computer Science* (UO)

- Barbara Szyszkowicz, *Probability* (C)

- Remì Vaillancourt, *Partial Differential Equations, Numerical Methods* (UO)

- G. Walsh, *Number Theory* (UO)

- K. S. Williams, *Number Theory* (C)

- Yong You, *Survey Sampling, Small Area Estimation, Hierarchical Bayes Inference, Survey Data Analysis* (C)

- M. Zarepour, *Resampling and Nonparametric Bayesian Inference, Time Series Analysis* (UO)

- Y. Zhao, *Applied Probability* (C)

Master of Science

Admission Requirements

The normal requirement for admission to the master's program is an Honours bachelor's degree in mathematics, or the equivalent, with at least high honours standing. Applicants holding a general (3-year) degree with at least high honours standing may be admitted to a qualifying-year program.

Subsequent admission to the regular master's program depends on performance during the qualifying-year program and will be decided no later than one year after admission to the qualifying-year program. Details are outlined in the General Regulations section of this Calendar. Students with outstanding academic performance and research promise while in the M.Sc. program may be permitted to transfer to the Ph.D. program without completing the M.Sc. program.

Special consideration may be given, for acceptance in the high-technology concentration, to graduates in computer science or engineering with a strong mathematical background and work experience in the high-technology sector.

Program Requirements

The two options for the M.Sc. program are:

- 2.5 credits and a thesis

- 4.0 credits

The courses must be chosen from those at the graduate level except that a student may take up to 1.0 credit of undergraduate courses at the 4000-level to satisfy these requirements.

Not all these courses may be taken in the same field of mathematics; at least 1.0 credit must be in another field. All master's students are required to participate actively in a seminar or project under the guidance of their adviser. A maximum of 1.0 credit taken outside of the School of Mathematics and Statistics at Carleton University or the Department of Mathematics and Statistics at the University of Ottawa may be allowed for credit.

Students who plan to specialize in probability or statistics are strongly advised that during their master's program they include, where possible, the courses STAT 5600, STAT 5501 in mathematical statistics, STAT 4502, STAT 5505 in applied statistics, and STAT 4501, STAT 5701 in probability, together with 1.0 credit further in the School of Mathematics and Statistics. In addition, a graduate course in another field, such as biology, biostatistics, economics, computer science, systems analysis, and stochastic modeling, is highly recommended.

High-Technology Concentration in the M.Sc.

An M.Sc. with a high-technology concentration is available. This concentration is intended for mathematics graduates interested in employment in the high technolaogy area; it is also intended for science or engineering graduates currently employed in the high-technology area who require a greater understanding of mathematics for their work. The course requirement for the high-technology designation on a student's transcript is completion of a minimum of six courses selected from the list of high-technology courses authorized by the Director of the Institute. Each student will be assigned an adviser who will be responsible for approving course selection.

Doctor of Philosophy

Admission Requirements

The normal requirement for admission to the Ph.D. program is a master's degree in mathematics, or the equivalent, with at least high honours standing. Details are outlined in the General Regulations section of this Calendar.

Program Requirements

Course requirements, which are determined at the time of admission, include a minimum of 3.0 credits and a suitable thesis. Not all of these courses may be taken in the same field of mathematics; at least 1.0 credit must be in another field.

All candidates must take comprehensive examinations, and must satisfy a language requirement. The language requirement is determined by the candidate's advisory committee and normally requires the ability to read mathematical literature in a language considered useful for his/her research or career, and other than the candidate's principal language of study.

Students specializing in mathematics or probability undertake a comprehensive examination in the following areas:

* The candidate's general area of specialization at the Ph.D. level

* Examinations on two topics chosen from algebra, analysis, probability, topology, and statistics. (This choice excludes the student's specialty.)

Students specializing in statistics must write an examination in the following areas:

* Mathematical statistics which includes multivariate analysis

* An examination in probability, and

* An examination in either (i) applied statistics, or (ii) analysis

In all cases, the examination must be completed successfully within twenty months of initial registration in the Ph.D. program in the case of full-time students, and within thirty-eight months of initial registration in the case of part-time students.

All Ph.D. candidates are also required to undertake a final oral examination on the subject of their thesis.

Selection of Courses

The following undergraduate courses may, with the approval of the School of Mathematics and Statistics, be selected by master's candidates in partial fulfillment of their degree requirements:

Mathematics and Statistics
MATH 4001	Vector Calculus
MATH 4105	Rings and Modules
MATH 4107	Commutative Algebra
MATH 4207	Foundations of Geometry
MATH 4208	Introduction to Differentiable Manifolds
MATH 4405	Analytical Dynamics
MATH 4406	Hydrodynamics and Elasticity
MATH 4407	Tensor Analysis and Relativity Theory
STAT 4501	Probability Theory
STAT 4502	Sampling: Theory and Methods
STAT 4503	Applied Multivariate Analysis
STAT 4506	Non-Parametric Methods
STAT 4508	Stochastic Models

STAT 4509   Stochastic Optimization

MATH 4702   Integral Transforms

MATH 4703   Qualitative Theory of Ordinary Differential Equations

MATH 4802   Introduction to Mathematical Logic

MATH 4803   Topics in Applied Logic

MATH 4804   Design and Analysis of Algorithms

MATH 4806   Numerical Analysis

MATH 4808   Graph Theory and Algorithms

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers (in parentheses) follow the Carleton course number and credit information.

MATH 5001 [0.5 credit] (formerly 70.501) (MAT 5120)
Abstract Measure Theory
Abstract measure and integral, L-spaces, complex measures, product measures, differentiation theory, Fourier transforms.
Prerequisite: MATH 4007.

MATH 5003 [0.5 credit] (formerly 70.503) (MAT 5122)
Banach Algebras
Commutative Banach algebras; the space of maximal ideals; representation of Banach algebras as function algebras and as operator algebras; the spectrum of an element. Special types of Banach algebras: for example, regular algebras with involution, applications.

MATH 5004 [0.5 credit] (formerly 70.504) (MAT 5129)
Integral Equations
A survey of the main results in the theory of non-singular linear integral equations; Volterra and Fredholm equations of first and second kind in the L2 case, with special results for the continuous case; Hermitian kernels; eigenfunction expansions; compact operators.
Prerequisites: MATH 3002 and MATH 4003.

MATH 5005 [0.5 credit] (formerly 70.505) (MAT 5127)
Complex Analysis
Complex differentiation and integration, harmonic functions, maximum modulus principle, Runge's theorem, conformal mapping, entire and meromorphic functions, analytic continuation.

MATH 5006 [0.5 credit] (formerly 70.506) (MAT 5316)
Topological Vector Spaces
Construction of new topological vector spaces out of given ones; local convexity and the Hahn-Banach theorem; compactness and the Krein-Milman theorem; conjugate spaces, polar sets.
Prerequisite: MATH 4003.

MATH 5007 [0.5 credit] (formerly 70.507) (MAT 5125)
Real Analysis I (Measure Theory and Integration)
General measure and integral, Lebesgue measure and integration on R, Fubini's theorem, Lebesgue-Radon-Nikodym theorem, absolute continuity and differentiation, LP-spaces. Selected topics such as Daniell-Stone theory. Also offered, with different requirements, as MATH 4007 for which additional credit is precluded.
Prerequisites: MATH 3001 and MATH 3002 (MAT 3125) or permission of the Department.

MATH 5008 [0.5 credit] (formerly 70.508) (MAT 5126)
Real Analysis II (Functional Analysis)
Banach and Hilbert spaces, bounded linear operators, dual spaces. Topics selected from: weak-topologies, Alaoglu's theorem, compact operators, differential calculus in Banach spaces, Riesz representation theorems. Also offered, with different requirements, as MATH 4003 for which additional credit is precluded.
Prerequisite: MATH 5007 (MAT 5125) or permission of the Department.

MATH 5009 [0.5 credit] (formerly 70.509) (MAT 5121)
Introduction to Hilbert Space
Geometry of Hilbert Space, spectral theory of linear operators in Hilbert Space.
Prerequisites: MATH 3001, MATH 3002, and MATH 4003.

MATH 5102 [0.5 credit] (formerly 70.512) (MAT 5148)
Group Representations and Applications
An introduction to group representations and character theory, with selected applications.

MATH 5103 [0.5 credit] (formerly 70.513) (MAT 5146)
Rings and Modules
Generalizations of the Wedderburn-Artin theorem and applications, homological algebra.

MATH 5104 [0.5 credit] (formerly 70.514)
(MAT 5143)
Lie Algebras
Basic concepts: ideals, homomorphisms,
nilpotent, solvable, semi-simple. Representations,
universal enveloping algebra. Semi-simple Lie
algebras: structure theory, classification, and
representation theory.
Prerequisites: MATH 5107 (MAT 5141) and
MATH 5109 (MAT 5142) or permission of the
Department.

MATH 5106 [0.5 credit] (formerly 70.516)
(MAT 5145)
Group Theory
Fundamental principles as applied to abelian,
nilpotent, solvable, free, and finite groups;
representations. Also offered, with different
requirements, as MATH 4106, for which
additional credit is precluded.
Prerequisite: MATH 3100 or permission of the
Department.

MATH 5107 [0.5 credit] (formerly 70.517)
(MAT 5141)
Algebra I
Groups, Sylow subgroups, finitely generated
abelian groups. Rings, field of fractions, principal
ideal domains, modules. Polynomial algebra,
Euclidean algorithm, unique factorization.
Prerequisite: Permission of the Department.

MATH 5108 [0.5 credit] (formerly 70.518)
(MAT 5147)
Homological Algebra and Category Theory
Axioms of set theory, categories, functors, natural
transformations; free, projective, injective and
flat modules; tensor products and homology
functors, derived functors; dimension theory. Also
offered, with different requirements, as MATH
4108 for which additional credit is precluded.
Prerequisite: MATH 3100 or permission of the
Department.

MATH 5109 [0.5 credit] (formerly 70.519)
(MAT 5142)
Algebra II
Field theory, algebraic and transcendental
extensions, finite fields, Galois groups. Modules
over principal ideal domains, decomposition of
a linear transformation, Jordan normal form.
Prerequisites: MATH 5107 (MAT 5141) and
permission of the Department.

MATH 5201 [0.5 credit] (formerly 70.521)
(MAT 5150)
Topics in Geometry
Various axiom systems of geometry. Detailed
examinations of at least one modern approach
to foundations, with emphasis upon the
connections with group theory.
Prerequisite: Permission of the Department.

MATH 5202 [0.5 credit] (formerly 70.522)
(MAT 5168)
Homology Theory
The Eilenberg-Steenrod axioms and their
consequences, singular homology theory,

applications to topology and algebra.
Prerequisite: MATH 4205.

MATH 5205 [0.5 credit] (formerly 70.525)
(MAT 5151)
Topology I
Topological spaces, product and identification
topologies, countability and separation axioms,
compactness, connectedness, homotopy,
fundamental group, net and filter convergence.
Also offered, with different requirements, as
MATH 4205 for which additional credit is
precluded.
Prerequisite: MATH 3001 or permission of the
Department.

MATH 5206 [0.5 credit] (formerly 70.526)
(MAT 5152)
Topology II
Covering spaces, homology via the Eilenberg-
Steenrod Axioms, applications, construction of
a homology functor. Also offered, with different
requirements, as MATH 4206 for which
additional credit is precluded.
Prerequisites: MATH 3100 (MAT 3143) and
MATH 5205 (MAT 5151) or permission of the
Department.

MATH 5207 [0.5 credit] (formerly 70.527)
(MAT 5169)
Foundations of Geometry
A study of at least one modern axiom system of
Euclidean and non-Euclidean geometry,
embedding of hyperbolic and Euclidean
geometries in the projective plane, groups of
motions, models of non-Euclidean geometry.
Prerequisite: MATH 3100 (may be taken
concurrently) or permission of the Department.

MATH 5208 [0.5 credit] (formerly 70.528)
(MAT 5155)
Differentiable Manifolds
A study of differentiable manifolds from the
point of view of either differential topology or
differential geometry. Topics such as smooth
mappings, transversality, intersection theory,
vector fields on manifolds, Gaussian curvature,
Riemannian manifolds, differential forms,
tensors, and connections are included.
Prerequisite: MATH 3001 or permission of the
Department.

MATH 5301 [0.5 credit] (formerly 70.531)
(MAT 5161)
Mathematical Logic
A basic graduate course in mathematical logic.
Propositional and predicate logic, proof theory,
Gentzen's Cut-Elimination, completeness,
compactness, Henkin models, model theory,
arithmetic and undecidability. Special topics
(time permitting) depending on interests of
instructor and audience.
Prerequisites: Honours undergraduate algebra,
analysis and topology or permission of the
instructor.

MATH 5305 [0.5 credit] (formerly 70.535)
(MAT 5163)
Analytic Number Theory
Dirichlet series, characters, Zeta-functions,
prime number theorem, Dirichlet's theorem on
primes in arithmetic progressions, binary
quadratic forms. Also offered at the
undergraduate level, with different
requirements, as MATH 4305, for which
additional credit is precluded.
Prerequisite: MATH 3007 or permission of the
Department.

MATH 5306 [0.5 credit] (formerly 70.536)
(MAT 5164)
Algebraic Number Theory
Algebraic number fields, bases, algebraic
integers, integral bases, arithmetic in algebraic
number fields, ideal theory, class number. Also
offered, with different requirements, as MATH
4306 for which additional credit is precluded.
Prerequisite: MATH 3100 or permission of the
Department.

MATH 5403 (formerly 70.543)
(MAT 5187)
Topics in Applied Mathematics

MATH 5405 [0.5 credit] (formerly 70.545)
(MAT 5131)
Ordinary Differential Equations
Existence and uniqueness theorems, boundary
value problems, qualitative theory.
Prerequisite: MATH 3008 or permission of the
Department.

MATH 5406 [0.5 credit] (formerly 70.546)
(MAT 5133)
**Introduction to Partial Differential
Equations**
First order linear, quasi-linear, and nonlinear
equations; second order equations in two or
more variables; systems of equations; the wave
equation; Laplace and Poisson equations;
Dirichlet and Neumann problems; Green's
functions. Also offered, with different
requirements, as MATH 4700 for which
additional credit is precluded.
Prerequisites: MATH 3002, or MATH 3007 and
MATH 3008, or permission of the Department.

MATH 5407 [0.5 credit] (formerly 70.547)
(MAT 5134)
Topics in Partial Differential Equations
Theory of distributions, initial-value problems
based on two-dimensional wave equations,
Laplace transform, Fourier integral transform,
diffusion problems, Helmholtz equation with
application to boundary and initial-value
problems in cylindrical and spherical
coordinates. Also offered, with different
requirements, as MATH 4701 for which
additional credit is precluded.
Prerequisite: MATH 5406 or permission of the
Department.

STAT 5500 [0.5 credit] (formerly 70.550)
(MAT 5177)
Multivariate Normal Theory
Multivariate normal distribution properties,
characterization, estimation of means, and
covariance matrix. Regression approach to
distribution theory of statistics; multivariate tests;
correlations; classification of observations; Wilks'
criteria.
Prerequisite: MATH 3500.

STAT 5501 [0.5 credit] (formerly 70.551)
(MAT 5191)
Mathematical Statistics II
Confidence intervals and pivotals; Bayesian
intervals; optimal tests and Neyman-Pearson
theory; likelihood ratio and score tests;
significance tests; goodness-of-fit-tests; large
sample theory and applications to maximum
likelihood and robust estimation. Also offered,
with different requirements, as MATH 4507 for
which additional credit is precluded.
Prerequisite: MATH 4500 or STAT 5600 or
permission of the Department.

STAT 5502 [0.5 credit] (formerly 70.552)
(MAT 5192)
Sampling Theory and Methods
Unequal probability sampling with and without
replacement; unified theory for standard errors;
prediction approach; ratio and regression
estimation; stratification and optimal designs;
multistage cluster sampling; double sampling;
domains of study; post-stratification;
nonresponse; measurement errors; related topics.
Prerequisite: MATH 4502 or permission of the
Department.

STAT 5503 [0.5 credit] (formerly 70.553)
(MAT 5193)
Linear Models
Theory of non full rank linear models; estimable
functions, best linear unbiased estimators,
hypotheses testing, confidence regions; multi-
way classifications; analysis of covariance;
variance component models; maximum
likelihood estimation, Minque, Anova methods;
miscellaneous topics.
Prerequisite: MATH 4500 or STAT 5600 or
permission of the Department.

STAT 5504 [0.5 credit] (formerly 70.554)
(MAT 5194)
Stochastic Processes and Time Series Analysis
Stationary stochastic processes, inference for
stochastic processes, applications to time series
and spatial series analysis.
Prerequisite: MATH 4501 or permission of the
Department.

STAT 5505 [0.5 credit] (formerly 70.555)
(MAT 5195)
Design of Experiments
Overview of linear model theory; orthogonality;
randomized block and split plot designs; latin
square designs; randomization theory;
incomplete block designs; factorial experiments:

confounding and fractional replication; response surface methodology. Miscellaneous topics.
Prerequisite: STAT 3505 or STAT 4500 or STAT 5600 or permission of the Department.

STAT 5506 [0.5 credit] (formerly 70.556) (MAT 5175)
Robust Statistical Inference
Nonparametric tests for location, scale, and regression parameters; derivation of rank tests; distribution theory of linear rank statistics and their efficiency. Robust estimation of location, scale and regression parameters; Huber's M-estimators, Rank-methods, L-estimators. Influence function. Adaptive procedures. Also offered, with different requirements, as MATH 4506 for which additional credit is precluded.
Prerequisite: MATH 4500 or STAT 5600 or permission of the Department.

STAT 5507 [0.5 credit] (formerly 70.557) (MAT 5176)
Advanced Statistical Inference
Pure significance test; uniformly most powerful unbiased and invariant tests; asymptotic comparison of tests; confidence intervals; large-sample theory of likelihood ratio and chi-square tests; likelihood inference; Bayesian inference; fiducial and structural methods; resampling methods.
Prerequisite: MATH 4507 or STAT 5501 or permission of the Department.

STAT 5508 [0.5 credit] (formerly 70.558) (MAT 5172)
Topics in Stochastic Processes
Course contents will vary, but will include topics drawn from Markov processes. Brownian motion, stochastic differential equations, martingales, Markov random fields, random measures, and infinite particle systems, advanced topics in modeling, population models, etc.
Prerequisites: STAT 3506 or STAT 4501, or permission of the Department.

STAT 5509 [0.5 credit] (formerly 70.559) (MAT 5196)
Multivariate Analysis
Multivariate methods of data analysis, including principal components, cluster analysis, factor analysis, canonical correlation, MANOVA, profile analysis, discriminant analysis, path analysis. Also offered at the undergraduate level, with different requirements, as MATH 4503, for which additional credit is precluded.
Prerequisite: MATH 4500 or STAT 5600 or permission of the Department.

STAT 5600 [0.5 credit] (formerly 70.560) (MAT 5190)
Mathematical Statistics I
Statistical decision theory; likelihood functions; sufficiency; factorization theorem; exponential families; UMVU estimators; Fisher's information; Cramer-Rao lower bound; maximum likelihood, moment estimation; invariant and robust point estimation; asymptotic properties; Bayesian

point estimation. Also offered, with different requirements, as MATH 4500 for which additional credit is precluded.
Prerequisite: MATH 3500 or permission of the Department.

STAT 5601 [0.5 credit] (formerly 70.561) (MAT 5197)
Stochastic Optimization
Topics chosen from stochastic dynamic programming, Markov decision processes, search theory, optimal stopping. Also offered at the undergraduate level, with different requirements, as MATH 4509, for which additional credit is precluded.
Prerequisite: STAT 3506 or permission of the Department.

STAT 5602 [0.5 credit] (formerly 70.562) (MAT 5317)
Analysis of Categorical Data
Analysis of one-way and two-way tables of nominal data; multi-dimensional contingency tables, log-linear models; tests of symmetry, marginal homogeneity in square tables; incomplete tables; tables with ordered categories; fixed margins, logistic models with binary response; measures of association and agreement; applications biological
Prerequisites: MATH 4500 or STAT 5600, MATH 4507 or STAT 5501, or permission of the Department.

STAT 5603 [0.5 credit] (formerly 70.563) (MAT 5318)
Reliability and Survival Analysis
Types of censored data; nonparametric estimation of survival function; graphical procedures for model identification; parametric models and maximum likelihood estimation; exponential and Weibull regression models; nonparametric hazard function models and associate statistical inference; rank tests with censored data applications.
Prerequisites: MATH 4500 or STAT 5600, MATH 4507 or STAT 5501 or permission of the Department.

STAT 5604 [0.5 credit] (formerly 70.564) (MAT 5173)
Stochastic Analysis
Brownian motion, continuous martingales, and stochastic integration.
Prerequisites: MATH 4501 or STAT 5708 or permission of the Department.

MATH 5605 [0.5 credit] (formerly 70.565) (MAT 5165)
Theory of Automata
Algebraic structure of sequential machines, decomposition of machines; finite automata, formal languages; complexity. Also offered, with different requirements, as MATH 4805/COMP 4805 for which additional credit is precluded.
Prerequisite: MATH 2100 or permission of the Department.

MATH 5607 [0.5 credit] (formerly 70.567) (MAT 5324)
Game Theory
Two-person zero-sum games; infinite games; multi-stage games; differential games; utility theory; two-person general-sum games; bargaining problem; n-person games; games with a continuum of players. Also offered, with different requirements, as MATH 4807 for which additional credit is precluded.
Prerequisite: MATH 3001 or permission of the Department.

MATH 5609 [0.5 credit] (formerly 70.569) (MAT 5301)
Topics in Combinatorial Mathematics
Prerequisite: Permission of the Department.

STAT 5701 [0.5 credit] (formerly 70.571) (MAT 5198)
Stochastic Models
Markov systems, stochastic networks, queuing networks, spatial processes, approximation methods in stochastic processes and queuing theory. Applications to the modeling and analysis of computer-communications systems and other distributed networks. Also offered, with different requirements, as MATH 4508 for which additional credit is precluded.
Prerequisite: STAT 3506 or permission of the Department.

STAT 5708 [0.5 credit] (formerly 70.578) (MAT 5170)
Probability Theory I
Probability spaces, random variables, expected values as integrals, joint distributions, independence and product measures, cumulative distribution functions and extensions of probability measures, Borel-Cantelli lemmas, convergence concepts, independent identically distributed sequences of random variables.
Prerequisites: MATH 3001, MATH 3002, and MATH 3500, or permission of the Department.

STAT 5709 [0.5 credit] (formerly 70.579) (MAT 5171)
Probability Theory II
Laws of large numbers, characteristic functions, central limit theorem, conditional probabilities and expectations, basic properties and convergence theorems for martingales, introduction to Brownian motion.
Prerequisite: STAT 5708 (MAT 5170) or permission of the Department.

MATH 5801 [0.5 credit] (formerly 70.581) (MAT 5303)
Linear Optimization
Linear programming problems; simplex method, upper bounded variables, free variables; duality; postoptimality analysis; linear programs having special structures; integer programming problems; unimodularity; knapsack problem.
Prerequisite: Course in linear algebra and permission of the Department.

MATH 5802 [0.5 credit] (formerly 70.582) (MAT 5325)
Introduction to Information and Systems Science
Introduction to the process of applying computers in problem solving. Emphasis on the design and analysis of efficient computer algorithms for large, complex problems. Applications: data manipulation, databases, computer networks, queuing systems, optimization. (Also listed as SYSC 5802, COMP 5802 and ISYS 5802.)

MATH 5803 [0.5 credit] (formerly 70.583) (MAT 5304)
Nonlinear Optimization
Methods for unconstrained and constrained optimization problems; Kuhn-Tucker conditions; penalty functions; duality; quadratic programming; geometric programming; separable programming; integer nonlinear programming; pseudo-Boolean programming; dynamic programming.
Prerequisite: Permission of the Department.

MATH 5804 [0.5 credit] (formerly 70.584) (MAT 5307)
Topics in Operations Research

MATH 5805 [0.5 credit] (formerly 70.585) (MAT 5308)
Topics in Algorithm Design

MATH 5806 [0.5 credit] (formerly 70.586) (MAT 5180)
Numerical Analysis
Error analysis for fixed and floating point arithmetic; systems of linear equations; eigen-value problems; sparse matrices; interpolation and approximation, including Fourier approximation; numerical solution of ordinary and partial differential equations.
Prerequisite: Permission of the Department.

MATH/COMP 5807 [0.5 credit] (formerly 70.587) (MAT 5167)
Formal Language and Syntax Analysis
Computability, unsolvable and NP-hard problems. Formal languages, classes of language automata. Principles of compiler design, syntax analysis, parsing (top-down, bottom-up), ambiguity, operator precedence, automatic construction of efficient parsers, LR, LR(O), LR(k), SLR, LL(k). Syntax directed translation.
Prerequisites: MATH 5605 or MATH 4805 or COMP 3002, or permission of the Department.

MATH 5808 [0.5 credit] (formerly 70.588) (MAT 5305)
Combinatorial Optimization I
Network flow theory and related material. Topics will include shortest paths, minimum spanning trees, maximum flows, minimum cost flows. Optimal matching in bipartite graphs.
Prerequisite: Permission of the Department.

MATH 5809 [0.5 credit] (formerly 70.589)
(MAT 5306)
Combinatorial Optimization II
Topics include optimal matching in non-bipartite graphs, Euler tours and the Chinese Postman problem. Other extensions of network flows: dynamic flows, multicommodity flows, and flows with gains, Bottleneck problems. Matroid optimization. Enumerative and heuristic algorithms for the Traveling Salesman and other "hard" problems.
Prerequisite: MATH 5808.

MATH 5900 [0.5 credit] (formerly 70.590)
(MAT 5990)
Seminar

MATH 5901 [0.5 credit] (formerly 70.591)
(MAT 5991)
Directed Studies

STAT 5902 [0.5 credit] (formerly 70.592)
(MAT 5992)
Seminar in Biostatistics
Students work in teams on the analysis of experimental data or experimental plans. The participation of experimenters in these teams is encouraged. Student teams present their results in the seminar, and prepare a brief written report on their work.

MATH 5903 [0.5 credit] (formerly 70.593)
Project
Intended for students registered in Information and Systems Science and M.C.S. programs. Students pursuing the non-thesis option will conduct a study, analysis, and/or design project. Results will be given in the form of a typewritten report and oral presentation.

STAT 5904 [0.5 credit] (formerly 70.594)
Statistical Internship
This project-oriented course allows students to undertake statistical research and data analysis projects as a cooperative project with governmental or industrial sponsors. Practical data analysis and consulting skills will be emphasized. The grade will be based upon oral and written presentation of results.
Prerequisite: Permission of the Institute.

MATH/SYSC/COMP 5905 [2.0 credits]
(formerly 70/94/95.595)
M.C.S. Thesis

MATH 5906 (formerly 70.596) (MAT 5993)
Research Internship
This course affords students the opportunity to undertake research in mathematics as a cooperative project with governmental or industrial sponsors. The grade will be based upon the mathematical content as well as upon oral and written presentation of results.
Prerequisite: Permission of the Institute.

MATH/ISYS/SYSC/COMP 5908 [1.5 credits]
(formerly 70/93/94/95.598)
M.Sc. Thesis in Information and Systems Science

MATH 5909 [1.5 credits] (formerly 70.599)
M.Sc. Thesis

MATH 6002 [0.5 credit] (formerly 70.602)
(MAT 5309)
Harmonic Analysis on Groups
Transformation groups; Haar measure; unitary representations of locally compact groups; completeness and compact groups; character theory; decomposition.

MATH 6008 [0.5 credit] (formerly 70.608)
(MAT 5326)
Topics in Analysis

MATH 6009 [0.5 credit] (formerly 70.609)
(MAT 5329)
Topics in Analysis

MATH 6101 [0.5 credit] (formerly 70.611)
(MAT 5327)
Topics in Algebra

MATH 6102 [0.5 credit] (formerly 70.612)
(MAT 5330)
Topics in Algebra

MATH 6103 [0.5 credit] (formerly 70.613)
(MAT 5331)
Topics in Algebra

MATH 6104 [0.5 credit] (formerly 70.614)
(MAT 5158)
Lie Groups
Matrix groups: one-parameter groups, exponential map, Campbell-Hausdorff formula, Lie algebra of a matrix group, integration on matrix groups. Abstract Lie groups.
Prerequisites: MATH 5007 and PADM 5107 or permission of the Department.

MATH 6201 [0.5 credit] (formerly 70.621)
(MAT 5312)
Topics in Topology

MATH 6507 [0.5 credit] (formerly 70.657)
(MAT 5313)
Topics in Probability and Statistics

MATH 6508 [0.5 credit] (formerly 70.658)
(MAT 5314)
Topics in Probability and Statistics

MATH 6806 [0.5 credit] (formerly 70.686)
(MAT 5361)
Topics in Mathematical Logic

MATH 6807 [0.5 credit] (formerly 70.687)
(MAT 5162)
Mathematical Foundations of Computer Science
Foundations of functional languages, lambda calculi (typed, polymorphically typed, untyped), Curry-Howard Isomorphism, proofs-as-programs, normalization and rewriting theory, operational semantics, type assignment, introduction to denotational semantics of programs, fixed-point programming.
Prerequisites: Honours undergraduate algebra and either topology or analysis, permission of the instructor or some acquaintance with logic.

MATH 6900 [0.5 credit] (formerly 70.690)
(MAT 6990)
Seminar

MATH 6901 [0.5 credit] (formerly 70.691)
(MAT 6991)
Directed Studies

MATH 6909 (formerly 70.699)
Ph.D. Thesis

The Ottawa-Carleton Institute for Mechanical and Aerospace Engineering

3091 Minto Centre
Carleton University
1125 Colonel By Drive
Telephone: (613) 520-5659
Fax: (613) 520-5682
E-mail: ocimae@carleton.ca

Université d'Ottawa
University of Ottawa

Carleton University

The Institute

Director of the Institute, F. Afagh

Established in 1984, the Institute combines the research strengths and resources of the Departments of Mechanical and Aerospace Engineering at Carleton University and Mechanical Engineering at the University of Ottawa. Programs leading to master's and Ph.D. degrees are available through the Institute in a range of fields of mechanical and aerospace and materials engineering. Graduate students may pursue their research on either university campus, depending upon the choice of supervisor. Registration will be at the university most appropriate to the student's program of studies and research. Requests for information and applications for admission may be sent to the Director of the Institute.

Members of the Institute

The "home" department of each member is indicated by (C) for the Department of Mechanical and Aerospace Engineering, Carleton University, and by (O) for the Department of Mechanical Engineering, University of Ottawa.

- F.F. Afagh, *Structural Dynamics and Control, Solid Mechanics, Smart Structures* (C)

- Melek Akben, *Metallurgy, Welding, Hot Working of Metals* (O)

- Andrei Artemev, *Phase Transformations, Solidification Processes* (C)

- J.C. Beddoes, *Physical Metallurgy and Metal Processing* (C)

- Robert Bell, *Finite Element Analysis, Stress Analysis, Solid Mechanics, Fracture Mechanics* (C)

- M.J. Bibby, *Materials and Manufacturing Engineering, Weld Analysis* (C)

- Y. Bourgault, *Computational Fluid Dynamics, Numerical Methods, Finite Element, Continuum Mechanics Modeling* (O, cross-appointed from Dept. of Mathematics and Statistics)

- Shui-Chih Cheng, *Heat Transfer, Numerical Methods* (O)

- M.C. de Malherbe, *Design, Manufacturing Engineering Processes* (C-Adjunct)

- Balbir Dhillon, *Reliability* (O)

- Atef Fahim, *CAD/CAM, Controls* (O)

- J.E.D. Gauthier, *Gas Turbine Technologies, Combustion* (C)

- J.A. Gaydos, *Thermodynamics, Continuum Mechanics* (C)

- J.A. Goldak, *Professor Emeritus, Computer-Integrated Manufacturing Processes, Finite Element Modeling of Manufacturing* (C)

- D.J. Gorman, *Professor Emeritus, Vibrations* (O)

- D.C. Groeneveld, *Heat Transfer, Two Phase Flow* (O-Adjunct)

- Yehia Haddad, *Applied Mechanics, Materials and Design* (O)

- W.L.H. Hallett, *Combustion* (O)

- F. Hamdullahpur, *Fluidized Beds, Hydrodynamics, Cyclone Modeling* (C)

- E.S. Hanff, *Unsteady Aerodynamics, Unsteady Wind Tunnel Techniques* (C-Adjunct)

- M.J.D. Hayes, *Space Robotics, Automated Optical Robot Calibration Systems, Robot Mechanical Systems, Theoretical Kinematics* (C)

- A. Jnifene, *Robotics, Vibration Control of Flexible Structures, Intelligent Control* (O)

- B. Jodoin, *Thermofluids, Plasma Physics* (O)

- R.J. Kind, *Aerodynamics of Aircraft and Turbomachinery* (C)

- J. Kofman, *Intelligent systems, computer-vision and imaging, biomedical applications* (O)

- A.S. Krausz, *Professor Emeritus, Fracture, Plasticity , Manufacturing* (O)

- M. Lamontagne, *Biomechanics and Biomedical Engineers* (O, cross-appointed from School of Human Kinetics)

- R. Langlois, *Flexible Multibody Dynamics; Vehicle Dynamics, Aircraft/Ship Dynamic Interface Analysis, Mathematical Modeling Simulation* (C)

- B.H.K. Lee, *Aerodynamics, Aeroelasticity* (O-Adjunct)

- Yung Lee, *Professor Emeritus, Heat Transfer, Nuclear Engineering* (O)

- Ming Liang, *Production and Manufacturing Engineering, Intelligent Systems* (O)

- R. Liu, *Fracture Mechanics, Fatigue, Crack Behaviour, Closure, Composite Materials, Numerical Methods, Finite Element Analysis* (C)

- L.C. Mallory, *Materials, Welding* (O)

- J.M. McDill, *Adaptive Thermal-microstructural Mechanical Finite Element Analysis for Manufacturing Processes* (C)

- N.B. McLaughlin, *Tractive Performance of Four-Wheel Drive Tractors* (C-Adjunct)

- R.E. Milane, *Combustion, Fluid Mechanics* (O)

- R. Miller, *Computational Materials Science, Multi-Scale Modeling of Materials, Atomistic Modeling of Crystalline Defects* (C)

- Shaukat Mirza, *Professor Emeritus, Vibrations, Stress Analysis* (O)

- Hany Moustapha, *Turbomachinery, Aerodynamics* (C-Adjunct)

- M.B. Munro, *Composite Materials* (O)

- Tofy Mussivand, *Medical Devices Design, Evaluation (in vitro, in vivo, clinical), Artificial Heart Sensors, Valves and Prosthetics* (C-Adjunct)

- D.S. Necsulescu, *Control, Robotics, Reliability* (O)

- F. Nitzsche, *Aeroelasticity, Control, Helicopter Noise, Smart Structures* (C)

- A.K. Pilkey, *Physical Metallurgy, Failure Mechanisms, Quantitative Metallography* (C-Adjunct)

- E.G. Plett, *Energy Systems, Fluid Mechanics, Thermodynamics and Heat Transfer, Numerical Modeling* (C)

- David Redekop, *Applied Mechanics, Finite Element Analysis, Robotics* (O)

- J.T. Rogers, *Professor Emeritus, Heat Transfer, Energy Systems, Nuclear Engineering* (C-Adjunct)

- D.L. Russell, *Dynamics, Controls, Medical Device Design* (C)

- J.Z. Sasiadek, *Robotics and Automation, Guidance, Navigation and Computer Control Systems* (C)

- R.K. Singhal, *Structural Dynamics, Vibration Analysis and Testing* (O-Adjunct)

- J.S. Sinkiewicz, *Robotics, Guidance, Navigation, Space* (C-Adjunct)

- S.A. Sjolander, *Aerodynamics, Turbomachinery, Wind-Tunnel Engineering* (C)

- D.A. Staley, *Spacecraft Dynamics and Control* (C)

- P.V. Straznicky, *Design, Light Weight Structures* (C)

- C.L. Tan, *Solid Mechanics, Fracture Mechanics, Boundary Integral and Finite Element Methods* (C)

- Stavros Tavoularis, *Fluid Mechanics, Experimental Techniques* (O)

- G. Tyc, *Spacecraft Dynamics and Control* (C-Adjunct)

- Frank Vigneron, *Space Dynamics* (C-Adjunct)

- W. Wallace, *Materials Engineering* (C-Adjunct)

- X. Wang, *Fracture Mechanics, Fatigue and Fracture, Finite Element Applications, Pressure Vessel and Piping* (C)

- J.Y. Wong, *Professor Emeritus, Vehicle Engineering, Transportation Technology* (C-Adjunct)

- M.J. Worswick, *Solid Mechanics, High Strain Rate, Metal Forming* (C-Adjunct)

- M.I. Yaras, *Turbomachinery, Aerodynamics, Computational Fluid Dynamics* (C)

- J.S. Zhang, *Material Emission Characteristics, Indoor Air Quality Modeling* (C-Adjunct)

- S. Zolfaghari, *Manufacturing, Operations and Production Management* (O)

Master's Degree

Admission Requirements

The normal requirement for admission to the master's program is a bachelor's degree with at least high honours standing in mechanical or aerospace engineering or a related discipline.

Program Requirements

M.A. Sc. – Master's by Thesis

The requirements for course work are specified in terms of credits: one credit is one hour/week for one term (thirteen weeks). The requirements for the master's degree by thesis are:

- Eighteen course credits

- Participation in the Mechanical and Aerospace Engineering seminar series

- Thesis

M.Eng. – Master's by Course Work

The requirements for the master's degree by course work are: twenty-seven course credits plus a project equivalent to nine course credits (Engineering MECH 5908 for Carleton University students; MCG 6000 for University of Ottawa students).

Guidelines for Completion of Master's Degree

Students are expected to complete the master's program within the maximum limits outlined in the Section 13.2 of the General Regulations section of this Calendar.

Doctor of Philosophy

Admission Requirements

The normal requirement for admission to the Ph.D. program is a master's degree in mechanical or aerospace engineering or a related discipline. Students who have been admitted to the master's program may be permitted to transfer into the Ph.D. program if they show outstanding academic performance and demonstrate significant promise for advanced research.

In addition, graduate courses offered by departments in other disciplines may be taken for credit with approval by the department in which the student is registered.

Program Requirements

The requirements for the Ph.D. degree (from the master's degree) are:

- Nine course credits

- Participation in the Mechanical and Aerospace Engineering seminar series

- Successful completion of qualifying examinations

- Thesis. The examining board for all theses will include professors from both departments and an external examiner who is a member of neither university.

Students who have been permitted to transfer into the Ph.D. program from a master's program require twenty-seven course credits for the Ph.D.

Guidelines for Completion of Doctoral Degree

Students are expected to complete the doctoral program within the maximum time limits outlined in section 13.3 of the General Regulations section of this Calendar. In addition, Ph.D. candidates are required to complete Parts I, II, and III of the Ph.D. comprehensive examinations according to the timing outlined in the Ph.D. comprehensive guidelines, which are distributed by the department involved.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003, please consult the Registration Instructions and Class Schedule booklet published in the summer.

In all programs, the student may choose graduate courses from either university with the approval of the adviser or the advisory committee. The available graduate courses are listed below, grouped by subject area. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one term duration.

The following codes identify the department offering the course: "MECH" Department of Mechanical and Aerospace Engineering, Carleton University, "MAAJ" Department of Mechanical Engineering, University of Ottawa.

Thermofluids
MECH 5000 (MCG 5300) MECH 5001 (MCG 5301)
MECH 5003 (MCG 5303) MECH 5004 (MCG 5304)
MECH 5008 (MCG 5308) MECH 5009 (MCG 5309)
MECH 5201 (MCG 5321) MECH 5300 (MCG 5330)
MECH 5301 (MCG 5331) MECH 5302 (MCG 5332)
MECH 5304 (MCG 5334) MECH 5403 (MCG 5343)
MECH 5407 (MCG 5347) MECH 5408 (MCG 5348)
MECH 5806 (MCG 5386) MAAJ 5101 (MCG 5111)
MAAJ 5301 (MCG 5131) MAAJ 5302 (MCG 5132)
MAAJ 5303 (MCG 5133) MAAJ 5304 (MCG 5134)
MAAJ 5306 (MCG 5136) MAAJ 5401 (MCG 5141)
MAAJ 5408 (MCG 5551) MAAJ 5409 (MCG 5552)
MAAJ 5500 (MCG 5557) MAAJ 5501 (MCG 5151)
MAAJ 5502 (MCG 5152) MAAJ 5505 (MCG 5155)
MAAJ 5506 (MCG 5156) MAAJ 5507 (MCG 5157)
MAAJ 5508 (MCG 5158) MAAJ 5601 (MCG 5161)
MAAJ 5901 (MCG 5191) MAAJ 5902 (MCG 5192)

Solid Mechanics and Materials
MECH 5107 (MCG 5317) MECH 5500 (MCG 5350)
MECH 5505 (MCG 5355) MECH 5601 (MCG 5361)
MECH 5602 (MCG 5362) MECH 5603 (MCG 5381)
MECH 5605 (MCG 5365) MECH 5606 (MCG 5366)
MECH 5607 (MCG 5367) MECH 5608 (MCG 5368)
MECH 5800 (MCG 5480I) MECH 5802 (MCG 5483I)
MECH 5803 (MCG 5488I) MECH 5804 (MCG 5384I)
MECH 5805 (MCG 5482I)
MAAJ 5001 (MCG 5101) MAAJ 5002 (MCG 5102)
MAAJ 5003 (MCG 5103) MAAJ 5004 (MCG 5104)
MAAJ 5005 (MCG 5105) MAAJ 5006 (MCG 5106)
MAAJ 5007 (MCG 5107) MAAJ 5008 (MCG 5108)
MAAJ 5009 (MCG 5109) MAAJ 5100 (MCG 5110)
MAAJ 5104 (MCG 5114) MAAJ 5105 (MCG 5115)
MAAJ 5107 (MCG 5117) MAAJ 5108 (MCG 5118)
MAAJ 5109 (MCG 5119) MAAJ 5206 (MCG 5126)
MAAJ 5209 (MCG 5129) MAAJ 5307 (MCG 5137)
MAAJ 5800 (MCG 5180) MAAJ 5801 (MCG 5181)
MAAJ 5802 (MCG 5182) MAAJ 5806 (MCG 5186)

Design and Manufacturing
MECH 5502 (MCG 5352) MECH 5503 (MCG 5353)
MECH 5601 (MCG 5361) MECH 5602 (MCG 5362)
MECH 5604 (MCG 5364) MECH 5704 (MCG 5374)
MECH 5705 (MCG 5375) MECH 5801 (MCG 5489I)
MAAJ 5105 (MCG 5115) MAAJ 5509 (MCG 5159)
MAAJ 5608 (MCG 5168) MAAJ 5609 (MCG 5169)
MAAJ 5700 (MCG 5170) MAAJ 5701 (MCG 5171)
MAAJ 5702 (MCG 5172) MAAJ 5703 (MCG 5173)

MAAJ 5706 (MCG 5176) MAAJ 5707 (MCG 5177)
MAAJ 5708 (MCG 5178) MAAJ 5709 (MCG 5179)
MAAJ 5805 (MCG 5185)

Transportation Technology
MECH 5100 (MCG 5310) MECH 5101 (MCG 5311)
MECH 5104 (MCG 5314) MECH 5105 (MCG 5315)
MECH 5201 (MCG 5321) MECH 5300 (MCG 5330)
MECH 5301 (MCG 5331) MECH 5401 (MCG 5341)
MECH 5402 (MCG 5342) MECH 5504 (MCG 5354)
MECH 5506 (MCG 5356) MAAJ 5308 (MCG 5138)
MECH 5906 (MCG 5395) MECH 5908 (MCG 5398)

Mechanical and Aerospace Engineering

Mackenzie Building 3135
Telephone: (613) 520-5684
Fax: (613) 520-5715
Email: maeinfo@mae.carleton.ca
Web site: www.mae.carleton.ca

The Department

Chair of the Department, Robert Bell

Associate Chair (Graduate Studies), J.A. Gaydos

In addition to University and Graduate Faculty regulations, all Engineering departments share common procedures that are described in Section 18 of the General Regulations of this Calendar.

The Department of Mechanical and Aerospace Engineering offers programs of study and research leading to M.A. Sc. and M.Eng. degrees in Aerospace Engineering, Materials Engineering, and Mechanical Engineering, and to Ph.D. degrees in Aerospace and Mechanical Engineering. These degrees are offered through the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering, which is jointly administered by the Department of Mechanical and Aerospace Engineering at Carleton University, and the Department of Mechanical Engineering at the University of Ottawa. For further information, including admission and program requirements, see the Institute's section of this Calendar.

Programs of research and study are offered in several areas:

- Aerodynamics and Gas Dynamics
- Heat Transfer
- Stress and Failure Analysis
- Lightweight Structures and Aeroelasticity
- Vibration Analysis
- Computer-Aided Design and Engineering
- Robotics
- Control Systems
- Vehicle (Performance and Safety)
- Engineering
- Nuclear Engineering
- Energy Systems
- Energy Conversion and Utilization
- Manufacturing Engineering
- Materials Engineering

The Department has a major research commitment, both analytical and experimental, to thermofluid-dynamic and mechanical problems of gas turbine engine design and operation. Current work includes flow prediction and analysis in turbo-machines; two-and three-dimensional boundary layer behaviour; tip-leakage effects and other losses; dynamics of gas turbine power plants; design and performance of highly loaded turbines; engine noise; stress, deformation, and vibration of compressor and turbine blades and discs; finite element analysis; dynamics of high-speed rotors and failure modes of materials in extreme environments.

Another area of intense research effort in the Department is computer-aided engineering. Activities in this field include computer-aided analysis (including computational fluid dynamics as well as the finite and boundary element methods), computer-aided design, and computer-integrated manufacturing. Projects include thermal and mechanical analysis of welding and casting processes, heat and fluid flow analyses, stress, deformation (manufacturing processes), vibration and fracture mechanics studies, and solids modeling. Computer-aided engineering is well supported by computer hardware and software, including a state-of-the-art network of engineering workstations. The Department has a substantial involvement in the Manufacturing Research Centre of Ontario.

As part of the faculty interest in transportation, the Department is active in research on air and ground vehicle technology. Current studies include computational methods for steady and unsteady flows over complex configurations; effects of roughness on aerodynamic performance; aircraft noise; boundary layer separation and control; propeller and rotor aerodynamics and noise. The Transport Technology Research Laboratory has been organized for ground transport studies; design and optimization of off-road vehicles; vehicle safety; anti-lock braking systems; vehicle-terrain interaction; effect of vibration on vehicle performance; dynamics of air-cushion and magnetically levitated vehicles and composite and structural elements.

Members of the Department are engaged in research on various aspects of energy conversion, storage, and utilization. In addition to the previously mentioned work on gas turbines, research is being undertaken on nuclear energy, effectiveness of energy end-use, and behaviour in wind of energy-conserving cladding systems for buildings. In the nuclear energy field, research is being undertaken in heat transfer and fluid flow aspects of CANDU and SLOWPOKE reactors, with a major effort on thermohydraulic problems in reactor safety. Work is also in progress on reactor safety in general, with a special emphasis on risk. Research activities in this field also include studies on the utilization

of CANDU reactors for thermal energy supply as well as electrical generation, and on applications of up-rated SLOWPOKE reactors to low-temperature industrial heating and to building energy needs. Research is being carried out into the structural integrity of CANDU reactor components in the form of evaluations of non-destructive testing methods suitable for zirconium alloy specimens.

Another area of interest is in design, manufacturing, and materials technology; in particular, there are programs on the properties of welded joints, heat treatment and forming studies.

The departmental laboratories are well equipped for the various research activities described above, and these are supported by a machine shop, electronics shop, and extensive computing facilities mentioned earlier.

The extensive laboratory facilities of the National Research Council, and of the Department of Resources Canada are also used, by special arrangement, for research and graduate studies of mutual interest. Strong contacts are maintained with the gas turbine, aircraft, and nuclear power industries.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers (in parentheses) follow the Carleton course number and credit information.

MECH 5000 [0.5 credit] (formerly 88.500) (MCG 5300)
Fundamentals of Fluid Dynamics
Differential equations of motion. Viscous and inviscid regions. Potential flow: superposition; thin airfoils; finite wings; compressibility corrections. Viscous flow: thin shear layer approximation; laminar layers; transition; turbulence modeling. Convective heat transfer: free versus forced convection; energy and energy integral equations; turbulent diffusion. Also offered at the undergraduate level, with different requirements, as AERO 4302, for which additional credit is precluded.

MECH 5001 [0.5 credit] (formerly 88.501) (MCG 5301)
Theory of Viscous Flows
Navier-Stokes and boundary layer equations; mean flow equations for turbulent kinetic energy; integral formulations. Stability, transition, turbulence, Reynolds stresses; separation. Calculation methods, closure schemes. Compressibility, heat transfer, and three-dimensional effects.

MECH 5003 [0.5 credit] (formerly 88.503) (MCG 5303)
Incompressible Non-Viscous Flow
The fundamental equations and theorems for non-viscous fluid flow; solution of two-dimensional and axisymmetric potential flows; low-speed airfoil and cascade theory; wing lifting-line theory; panel methods.

MECH 5004 [0.5 credit] (formerly 88.504) (MCG 5304)
Compressible Non-Viscous Flow
Steady isentropic, frictional, and diabatic flow; shock waves; irrotational compressible flow, small perturbation theory and similarity rules; second-order theory and unsteady, one-dimensional flow.

MECH 5008 [0.5 credit] (formerly 88.508) (MCG 5308)
Experimental Methods in Fluid Mechanics
Fundamentals of techniques of simulation of fluid dynamic phenomena. Theoretical basis, principles of design, performance and instrumentation of ground test facilities. Applications to aerodynamic testing.

MECH 5009 [0.5 credit] (formerly 88.509) (MCG 5309)
Environmental Fluid Mechanics Relating to Energy Utilization
Characteristics of energy sources and emissions into the environment. The atmosphere; stratification and stability, equations of motion, simple winds, mean flow, turbulence structure and dispersion near the ground. Flow and dispersion in groundwater, rivers, lakes and oceans. Physical and analytical modeling of environmental flows.

MECH 5100 [0.5 credit] (formerly 88.510) (MCG 5310)
Performance and Economics of Aircraft
Aircraft performance analysis with emphasis on factors affecting take-off, landing and economic performance; high lift schemes; operating economics.

MECH 5101 [0.5 credit] (formerly 88.511) (MCG 5311)
Dynamics and Aerodynamics of Flight
Static stability theory. Euler's equations for rigid body motion; the linearized equations of motion; stability derivatives and their estimation. Longitudinal and lateral dynamic response of an aircraft to control and disturbance. Also offered at the undergraduate level, with different

requirements, as AERO 4308, for which additional credit is precluded.

MECH 5104 [0.5 credit] (formerly 88.514) (MCG 5314)
Ground Transportation Systems and Vehicles
Performance characteristics, handling and directional stability, ride comfort and safety of various types of ground vehicle systems including road vehicles, terrain-vehicle systems, guided transport systems, and advanced ground transport technology.

MECH 5105 [0.5 credit] (formerly 88.515) (MCG 5315)
Orbital Mechanics and Space Control
Orbital dynamics and perturbations due to the Earth's figure, the sun, and the moon with emphasis on mission planning and analysis. Rigid body dynamics applied to transfer orbit and on-orbit momentum management and control of spacecraft. Effects of flexible structures on a spacecraft control system.

MECH 5107 [0.5 credit] (formerly 88.517) (MCG 5317)
Experimental Stress Analysis
Introduction to theory of elasticity. Photo-elasticity: types of polariscopes, two- and three-dimensional stress fields, frozen patterns. Photoelastic coatings. Strain gauges; gauge factors, sensitivity, calibration, and temperature compensation. Moire fringes, brittle lacquers, mechanical strain gauges.

MECH 5201 [0.5 credit] (formerly 88.521) (MCG 5321)
Methods of Energy Conversion
Technical, economic and environmental aspects of present and proposed large-scale systems of energy conversion.

MECH 5300 [0.5 credit] (formerly 88.530) (MCG 5330)
Engineering Acoustics
Review of acoustic waves in compressible fluids; acoustic pressure, intensity and impedance; physical interpretation and measurement; transmission through media; layers, in-homogeneous media, solids; acoustic systems; rooms, ducts, resonators, mufflers, properties of transducers; microphones, loudspeakers, computational acoustics.

MECH 5301 [0.5 credit] (formerly 88.531) (MCG 5331)
Aeroacoustics
The convected wave equation; theory of subsonic and supersonic jet noise; propeller and helicopter noise; fan and compressor noise; boundary layer noise, interior noise; propagation in the atmosphere; sonic boom; impact on environment.

MECH 5302 [0.5 credit] (formerly 88.532) (MCG 5332)
Instrumentation Techniques
An introduction for the non-specialists to the concepts of digital and analog electronics with emphasis on data acquisition, processing and analysis. Topics covered include operational amplifiers, signal processing, digital logic systems, computer interfacing, noise in electronic systems. Hands-on sessions illustrate theory and practice.

MECH 5304 [0.5 credit] (formerly 88.534) (MCG 5334)
Computational Fluid Dynamics of Compressible Flows
Solution techniques for parabolic, elliptic and hyperbolic equations developed for problems of interest to fluid dynamics with appropriate stability considerations. A staged approach to solution of full Euler and Navier-Stokes equations is used. Grid generation techniques appropriate for compressible flows are introduced.

MECH 5401 [0.5 credit] (formerly 88.541) (MCG 5341)
Turbomachinery
Types of machines. Similarity: performance parameters; characteristics; cavitation. Velocity triangles. Euler equation: impulse and reaction. Radial pumps and compressors: analysis, design and operation. Axial pumps and compressors: cascade and blade-element methods; staging; off-design performance; stall and surge. Axial turbines. Current design practice. Also offered at the undergraduate level, with different requirements, as MECH 4305, for which additional credit is precluded.

MECH 5402 [0.5 credit] (formerly 88.542) (MCG 5342)
Gas Turbines
Interrelationship among thermodynamic, aerodynamic, and mechanical design. Ideal and real cycle calculations. Cycle optimization; turbo-shaft, turbojet, turbofan. Component performance. Off-design performance; matching of compressor, turbine, nozzle. Twin-spool matching.

MECH 5403 [0.5 credit] (formerly 88.543) (MCG 5343)
Advanced Thermodynamics
The course covers three major topics: review of fundamentals from a consistent viewpoint, properties and equations of state, and applications and special topics. The third topic includes an introduction to statistical thermodynamics.

MECH 5407 [0.5 credit] (formerly 88.547) (MCG 5347)
Conductive and Radiative Heat Transfer
Analytical, numerical and analog solutions to steady-state and transient conduction heat

transfer in multi-dimensional systems. Radiative heat exchange between black, grey, non-grey diffusive and specular surfaces, including effects of athermanous media.

MECH 5408 [0.5 credit] (formerly 88.548) (MCG 5348)
Convective Heat and Mass Transfer
Analogies between heat, mass and momentum transfer. Forced and free convection relations for laminar and turbulent flows analytically developed where possible and otherwise deduced from experimental results, for simple shapes and in heat exchangers. Mass transfer theory and applications.

MECH 5500 [0.5 credit] (formerly 88.550) (MCG 5350)
Advanced Vibration Analysis
General theory of continuous and discrete multi-degree-of-freedom vibrating systems. Emphasis on numerical techniques of solving complex vibrating systems, with selected applications from aerospace, civil, and mechanical engineering.

MECH 5502 [0.5 credit] (formerly 88.552) (MCG 5352)
Optimal Control Systems
Review of transfer function and state-space system descriptions. Elements of the optimal control problem. Variational calculus. Optimal state feedback control. Riccati equations. Optimal observers and Kalman-Bucy Filters. Extension to discrete time systems including an introduction to dynamic programming. Practical applications are emphasized throughout the course.

MECH 5503 [0.5 credit] (formerly 88.553) (MCG 5353)
Robotics
The history of and introduction to robotics methodology. Robots and manipulators; homogeneous transformation, kinematic equations, solving kinematic equations, differential relationships, motion trajectories, dynamics. Control; feedback control, compliance, servomotors, actuators, external and internal sensors, grippers and vision systems. Microprocessors and their application to robot control. Programming.

MECH 5504 [0.5 credit] (formerly 88.554) (MCG 5354)
Guidance, Navigation and Control
Guidance system classification, flight control systems, targeting, target tracking, sensing. Modern multivariable control analysis; design requirements, sensitivity, robustness, perturbations, performance analysis. Modern filtering and estimation techniques. Terrestrial navigation; tactical air navigation (TACAN), star trackers Guidance mission and performance. Aircraft, missile and spacecraft guidance and control.

MECH 5505 [0.5 credit] (formerly 88.555) (MCG 5355)
Stability Theory and Applications
Fundamental concepts and characteristics of modern stability definitions. Sensitivity and variational equations; linear variational equations; phase space analysis; Lyapunov's direct method. Autonomous and nonautonomous systems; stability in first approximation; the effect of force type on stability; frequency method.

MECH 5506 [0.5 credit] (formerly 88.556) (MCG 5356)
Neuro and Fuzzy Control
Knowledge-based controllers. Fuzzy control: mathematics; relations, operations, approximate reasoning. Fuzzy knowledge base control and structure. Fuzzification, inference engine, defuzzification. Nonlinear, adaptive fuzzy control systems. Stability, Neuro-control: processing, learning. Adaptation of artificial neural systems: associative memories, algorithms, applications, and network implementation. Neurofuzzy systems: industrial applications.

MECH 5601 [0.5 credit] (formerly 88.561) (MCG 5361)
Creative Problem Solving and Design
Problem-solving processes and how they can be applied in engineering design. Emphasis on learning methodologies rather than accumulating information. Techniques can be successfully applied in any engineering specialty. (Also listed as IDES 5301.)

MECH 5602 [0.5 credit] (formerly 88.562) (MCG 5362)
Failure Prevention (Fracture Mechanics and Fatigue)
Design of engineering structures to ensure against failure due to fatigue or brittle fracture. Nature of fatigue and brittle fracture; selection of suitable material, geometry, and inspection procedures for the load and environmental conditions.

MECH 5603 [0.5 credit] (formerly 88.563) (MCG 5381)
Lightweight Structures
Structural behaviour. Fundamentals of basic elasticity. Energy methods of structural analysis. Bending, shear, and torsion of open and closed multicell structures. Bending of plates. Structural idealization and its effects on open and closed sections. Structural stability.

MECH 5604 [0.5 credit] (formerly 88.564) (MCG 5364)
Computational Metallurgy
Development of microstructure in alloys in solidification processes and post-solidification processing. Nucleation and growth of solid phase. Formation of a dendrite structure, macro and micro segregations. Pore formation in castings. Thermodynamic and kinetics of phase transformations and structure evolution in solid alloys.

MECH 5605 [0.5 credit] (formerly 88.565)
(MCG 5365)
Finite Element Analysis I
An introduction to the finite element methodology, with emphasis on applications to heat transfer, fluid flow and stress analysis. The basic concepts of Galerkin's method, interpolation, numerical integration, and isoparametric elements are taught using simple examples.

MECH 5606 [0.5 credit] (formerly 88.566)
(MCG 5366)
Finite Element Analysis II
Time marching heat flow problems with linear and nonlinear analysis. Static plasticity. Time-dependent deformation problems; viscoplasticity, viscoelasticity, and dynamic analysis. Isoparametric elements and numerical integration are used throughout.

MECH 5607 [0.5 credit] (formerly 88.567)
(MCG 5367)
The Boundary Integral Equation (BIE) Method
Integral equations. The BIE for potential theory and for elastostatics in two-dimensions. Boundary elements and numerical integration schemes. Practical applications.

MECH 5608 [0.5 credit] (formerly 88.568)
(MCG 5368)
Advanced Engineering Materials
The physical metallurgy of important engineering metals and alloys: analytical techniques, crystallography and structure of alloys, dislocation interactions and dissociation, metallurgical thermodynamics and transformations and strengthening mechanisms. Highlights the physical phenomena controlling the properties.
Prerequisite: MECH 2700 or the equivalent.

MECH 5704 [0.5 credit] (formerly 88.574)
(MCG 5374)
Computer-Integrated Manufacturing Systems (CIMS)
Topics essential to CIMS including computer graphics, geometric modeling, numerically controlled machining, and flexible manufacturing. The fundamental data structures and procedures for computerization of engineering design, analysis and production. Also offered at the undergraduate level, with different requirements, as MECH 4704, for which additional credit is precluded.

MECH 5705 [0.5 credit] (formerly 88.575)
(MCG 5375)
CAD/CAM
Computer aided design and manufacturing methodology through hands-on experience and state-of-the-art software. Topics include mathematical representation, solid modeling, drafting, mechanical assembly, mechanism design and CNC machining. CAD data exchange standards, rapid prototyping, concurrent engineering and design for X are also discussed.

MECH 5800 [0.5 credit] (formerly 88.580)
(MCG 5480I)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2003: Gas Turbine Combustion. The course covers two major topics: combustion fundamentals and combustor design. Combustion fundamentals include chemistry of combustion, chemical kinetics, and emissions formation. Combustor design will address the interrelationship between design requirements and combustion fundamentals.

MECH 5801 [0.5 credit] (formerly 88.581)
(MCG 5489I)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2003: Biomechanics. Human anatomy and physiology with an emphasis on artificial organ and prosthetic device design requirements. Application of engineering principles to cells and tissues, biofluid mechanics, human body energetics, measurement techniques, mechanics of the musculoskeletal, circulatory and pulmonary systems. Emphasis on the artificial heart. Also offered at the undergraduate level, with different requirements, as MAAE 4906, for which additional credit is precluded.

MECH 5802 [0.5 credit] (formerly 88.582)
(MCG 5483I)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2003: Welding Engineering. Welding processes and design. Topics include: welding processes and symbols, metallurgical aspects of welding, heat transfer, design and stress analysis, fracture of welds, non-destructive testing and welding codes, welding case studies. Also offered at the undergraduate level, with different requirements, as MECH 4906, for which additional credit is precluded.

MECH 5803 [0.5 credit] (formerly 88.583)
(MCG 5488I)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2003: Tribology. Offered for graduate students in engineering departments. Application of the tribological approach to solving engineering problems. Tribology – the study of friction, wear, and lubrication. Theoretical subjects are illustrated with "case studies".

MECH 5804 [0.5 credit] (formerly 88.584)
(MCG 5384I)
Special Topics in Mechanical and Aerospace Engineering
Topic will vary from year to year. Topic for 2002-2003: Microstructure and Properties of Engineering Materials. Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Time will be spent

studying analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Prerequisite: MAAE 2700 or equivalent.

MECH 5805 [0.5 credit] (formerly 88.585) (MCG 5482l)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2003: Advanced Space Studies. Space technology, physics and life sciences related to manned spaceflight Topics may include spacecraft design, technical requirements for manned spaceflight, shuttle systems, biology, fluid physics in microgravity, remote sensing from space, aeronomy, and the mobile servicing system. Also offered at the undergraduate level, with different requirements, as MAAE 4906, for which additional credit is precluded.

MECH 5806 (formerly 88.586) [0.5 credit] (MCG 5486l)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2003: Continuum Thermodynamics. Equilibrium and non-equilibrium thermodynamics as a field theory. Topics include: conditions of equilibrium, Gibbs-Duhem relation, Legendre transforms and their use, Maxwell relations with simple applications, concept of local equilibrium, hydrodynamic equations, phenomenological relations. Applications to both simple and more complex systems.
Prerequisite: Undergraduate courses in matrix algebra, calculus of several variables, ordinary differential equations.

MECH 5807 (formerly 88.587) [0.5 credit] (MCG 5387l)
Special Topics in Mechanical and Aerospace Engineering
Topic for 2002-2002: Smart Structures and applications. Structural Dynamics principles: modal analysis and wave propagation. Linear Time Invariant systems: feedback, feedforward, SISO, MIMO, digital and adaptive filters. "Smart" Structures: multifunctional materials, collocation principles, geometric filtering, and control authority. Applications in Aero-acoustics and Aeroelasticity.

MECH 5906 [0.5 credit] (formerly 88.596) (MCG 5395)
Directed Studies

MECH 5908 [1.5 credits] (formerly 88.598) (MCG 5398)
Independent Engineering Study
Students pursuing a master's degree by course work carry out an independent study, analysis, and solution of an engineering problem or design project. The results are given in the form of a written report and presented at a departmental seminar. Carried out under the general direction of a faculty member.

MECH 5909 [2.0 credits] (formerly 88.599)
M.A. Sc. Thesis

MECH 6909 (formerly 88.699) [8.5 credits]
Ph.D. Thesis

Other Courses of Particular Interest

Civil and Environmental Engineering
CIVE 5101, CIVE 5102, CIVE 5103, CIVE 5204, CIVE 5304, CIVE 5602

Mathematics and Statistics
MATH 4806 Numerical Analysis

MATH 5806

Physics
PHYS 4407 Statistical Physics

PHYS 5101

Systems and Computer Engineering
SYSC 5001, SYSC 5004, SYSC 5005, SYSC 5401, SYSC 5402, SYSC 5502, SYSC 5503

Mechanical Engineering (University of Ottawa)

University of Ottawa
Room A-205 Colonel By Hall
Telephone: (613) 562-5834
Fax: (613) 562-5177

The Department

Chair of the Department, W.L.H. Hallett

Graduate Studies Officer, D. Redekop

The Department of Mechanical Engineering is one of the two constituents of the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering. Consult the Institute's section in this Calendar for a faculty list, graduate program descriptions, and admission requirements.

Programs of research and study are offered in several areas. Most research projects in the Department are in the general fields of thermofluids, solid mechanics, materials and design, manufacturing, and industrial engineering. Members of the Department are engaged in research on the following topics: elasticity, plasticity, viscoelasticity, micromechanics of solids, stress analysis of shells, shell dynamics, structural dynamics, strength of materials, vibration, flow-induced vibration, hot working of metals, welding, time and temperature dependent solid state processes, constitutive relations of plasticity and fracture, fibre composite materials, automated manufacturing of composites, two-phase heat transfer and fluid flow related to nuclear reactors, two-phase thermosyphons, turbulent flow structure, turbulent diffusion, flow and heat transfer in rod bundles, hemodynamics of cardiac assist devices, supersonic aerodynamics, thermal spraying processes, computational fluid dynamics, flow visualization, heat exchangers, power generation, liquid fuel combustion, fuel bed combustion, integrated computer-aided design systems, computer-aided manufacturing and automation, computer control of mechanical systems, robot design and control, computer vision for control of machines, reliability modeling, human reliability, common-cause failures, transit system reliability, and power production system reliability.

Research Facilities

Research is conducted in large, modern and well-equipped laboratories containing wind tunnels, water tunnels, two-phase heat transfer and fluid flow loops, submerged arc welders, computer controlled filament winder, triaxial composite braider, material testing apparatus including computer-controlled tensile machine, hydraulic fatigue testing machine and impact tester, metallographic apparatus, instrumented GTA welding facility, high-speed data acquisition systems, shaker table, a state of the art CAD/CAM facility, robots, computer controllers, computer controlled machine tools, fuel bed combustor, high pressure droplet chamber, supersonic cold spray system.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 please consult the Registration Instructions and Class Schedule booklet published in the summer.

MAAJ 5001 [0.5 credit] (formerly 89.501)
(MCG 5101)
Theory of Elasticity
Analysis of stress and strain. Stress and strain tensors. Yield criteria laws of elasticity and general theorems. Stress functions. Two-dimensional problems in rectangular and polar coordinates. Applications in plates and shells. Strain energy techniques. Application of numerical analysis to elasticity problems.

MAAJ 5002 [0.5 credit] (formerly 89.502)
(MCG 5102)
Advanced Stress Analysis
Solutions to special beam problems including beams on elastic foundations, curved beams, multi-span beams, etc. as well as some axisymmetric problems. The significance of assumptions is discussed and solution techniques including series solutions and energy methods are utilized.

MAAJ 5003 [0.5 credit] (formerly 89.503)
(MCG 5103)
Theory of Perfectly Plastic Solids
Inelastic behaviour, model materials. Yield criteria and flow laws. Energy principles. Contained plastic deformation. Plane strain. Slipline fields. Applications to metal-forming processes.

MAAJ 5004 [0.5 credit] (formerly 89.504)
(MCG 5104)
Theory of Plates and Shells
A general coverage of various approaches to plate problems and the application of these methods to practical cases. A study of the theory of shells including deformation of shells without bending, stresses under various loading conditions, general theory of shells, shells forming surfaces of revolution.

MAAJ 5005 [0.5 credit] (formerly 89.505)
(MCG 5105)
Continuum Mechanics
Fundamental equations of continuum mechanics. Thermodynamics of continua. Rheological equations. Hamilton's principle for continua. Analytical solution of some elasticity and incompressible fluid dynamic problems. Extension to viscoelasticity and plasticity. Sound waves. Shock waves. Numerical methods of solution.

MAAJ 5006 [0.5 credit] (formerly 89.506)
(MCG 5106)
Advanced Topics in Elasticity
Algebraic computation software. Curved solids. Governing equations of planar elastostatics in Cartesian coordinates. Governing equations of plates. Linear shell theory in curvilinear coordinates. Introduction to non-linear elastostatics. Non-linear shell theory. Instability of cylindrical shells. Thick and thin shell elastodynamics.

MAAJ 5007 [0.5 credit] (formerly 89.507)
(MCG 5107)
Advanced Dynamics with Applications
Review of Euler/Newton and D'Alembert formulation, Euler Angles, Gyrodynamics, analysis and response of rotating machinery. Lagrangian synamics, generalized coordinates, virtual work, generalized forces and the power function. System constraint forces and equilibrium. Modeling and formulation of multi-degree of greedom vibrational, electro-mechanical, dissipative systems and other engineering applications.

MAAJ 5008 [0.5 credit] (formerly 89.508)
(MCG 5108)
Finite Element Analysis
Review of matrix algebra and structural mechanics. Direct and variational approaches in the FE analysis of a continuum. Elastic plane stress, plane strain, axisymmetric and three-dimensional elasticity. Elementary FE programming. Isoparametric concept, conforming and non-conforming elements. Thin and thick plates. Thin and thick shells, axisymmetric shells. Steady-state field problems. Intermediate FE programming. Introduction to FE software. Applications in mechanical engineering.

MAAJ 5009 [0.5 credit] (formerly 89.509)
(MCG 5109)
Advanced Topics in Finite Element Analysis
Finite elements and their solution techniques. Multilayered plate, shell and continua. Eigenvalue and transient analysis, material and geometric non-linearities. Applications to fracture mechanics. Steady and transient state heat conduction. Potential flow. Creeping flow and incompressible viscous flow with inertia.

MAAJ 5100 [0.5 credit] (formerly 89.510)
(MCG 5110)
Micromechanics of Solids
Introduction. Classes of materials in micromechanics. Cartesian tensor notation. Random theory of deformation. Analysis of stress, strain and motion. The stochastic deformation process. Structured materials and intelligent systems. Experimental approaches.

MAAJ 5101 [0.5 credit] (formerly 89.511)
(MCG 5111)
Gas Dynamics
Review of thermodynamics of perfect gases. Conservation equations. Wave propagation in compressible media. Normal and oblique shock waves. Prandtl-Meyer expansion fans. Applications. Ideal gas flow in ducts of variable section, friction, heat transfer. Method of characteristics. Imperfect gas effects, dissociation, ionization. Methods of measurement.

MAAJ 5104 [0.5 credit] (formerly 89.514)
(MCG 5114)
Analysis and Design of Pressure Vessels
Principles of design, materials, preliminary layout. Elastic analysis of axisymmetric shells. Discontinuity analysis. Numerical methods, nozzle-shell analysis. Plastic collapse, fatigue, fracture, creep, buckling.

MAAJ 5105 [0.5 credit] (formerly 89.515)
(MCG 5115) ·
Non-Linear Optimization
Formulation of optimization problems. Unconstrained optimization: direct search techniques, gradient techniques. Constrained optimization: by unconstrained minimization, by direct methods. Mathematical programming. Geometric programming. Dynamic programming. Examples and applications in Mechanical Engineering topics.

MAAJ 5107 [0.5 credit] (formerly 89.517)
(MCG 5117)
Introduction to Composite Materials
Review of strengthening mechanism in metals and polymers. Fibre-reinforced composite materials: strengthening mechanisms, prediction of strengths and moduli, specific properties, fracture mechanisms, toughness, fatigue, creep, effect of environment; fabrication methods and engineering applications. Laminates; mechanical properties and engineering applications.

MAAJ 5108 [0.5 credit] (formerly 89.518)
(MCG 5118)
Introduction to Plasticity
The analysis of stress and strain in elastic and plastic continuum. Time independent plastic deformation. The microscopic basis of plastic behaviour. Rate dependent deformation. The effect of temperature. Materials testing. Applications.

MAAJ 5109 [0.5 credit] (formerly 89.519)
(MCG 5119)
Fracture Mechanics
Stress concentration in elastic and plastic media. The energy condition, crack resistance, compliance, the J. integral. Crack arrest. Plain strain and plain stress behaviour. The microscopic aspects of crack propagation. The effect of temperature. Fatigue, stress corrosion cracking, and creep fracture. Probabilistic fracture.

MAAJ 5206 [0.5 credit] (formerly 89.526)
(MCG 5126)
Deformation of Materials
The deformation and fracture properties of metals, ceramics and polymers. Introduction to dislocation theory. Rheological models. Analysis and interpretation of constant strain rate, constant stress and stress relaxation tests in terms of the material structure.

MAAJ 5209 [0.5 credit] (formerly 89.529)
(MCG 5129)
Hot Working of Metals
High temperature mechanical properties in metal. Types of recovery, recrystallization and precipitation in metals and their effects on hot strength and structure. Hot rolling metals. Selection of rolling schedules. Influence of as-rolled structures on room temperature tensile and fracture stresses, impact strength.

MAAJ 5301 [0.5 credit] (formerly 89.531)
(MCG 5131)
Heat Transfer by Conduction
Steady one-dimensional systems. Equations of Bessel and Legendre. Extended surface. Fourier series and integration of partial differential equations. Steady two-dimensional systems. Steady-state numerical methods. Steady heat source systems. Steady porous systems. Transient systems; stationary and moving sources. Transient numerical methods

MAAJ 5302 [0.5 credit] (formerly 89.532)
(MCG 5132)
Heat Transfer by Convection
General problems of convection. Fundamental equations. Boundary layer equations. Forced convection in laminar flow. Forced convection in turbulent flow. Free convection. Condensing and boiling. Heat transfer to liquid metals. Heat transfer in high-speed flow. Special topics.

MAAJ 5303 [0.5 credit] (formerly 89.533)
(MCG 5133)
Heat Transfer by Radiation
Thermal radiation and radiation properties. Radiant interchange among surfaces separated by radiatively non-participating media. Radiant energy transfer through absorbing, emitting and scattering media. Combined conduction and radiation. Combined convection and radiation.

MAAJ 5304 [0.5 credit] (formerly 89.534)
(MCG 5134)
Heat Transfer with Phase Change
Pool boiling. Hydrodynamics of two-phase flow. Flow boiling and flow boiling crisis. Instability of two-phase flow. Condensation.

MAAJ 5306 [0.5 credit] (formerly 89.536)
(MCG 5136)
Special Studies in Fluid Mechanics and Heat Transfer
Current topics in the field.

MAAJ 5307 [0.5 credit] (formerly 89.537)
(MCG 5137)
Special Studies in Solid Mechanics and Materials
Current topics in the field.

MAAJ 5308 [0.5 credit] (formerly 89.538)
(MCG 5138)
Advanced Topics in Mechanical Engineering
Current topics in the field.

MAAJ 5401 [0.5 credit] (formerly 89.541)
(MCG 5141)
Statistical Thermodynamics
Kinetic theory of an ideal gas. The distribution of molecular velocities. Transport phenomena. Maxwell-Boltzmann statistics. Quantum mechanics. Quantum statistics. Partition functions. Partition functions and thermodynamic properties. Derivations of specific heats of gases. Gas mixtures. Law of mass action.

MAAJ 5408 [0.5 credit] (formerly 89.548)
(MCG 5551)
Théorie d'Écoulement Visqueux
Dérivation des solutions exactes des équations de Navier-Stokes. Écoulement à petit nombre de Reynolds. Écoulement de Stokes. Écoulement d'Oseen. Théorie de lubrification. Couches limites laminaires. Introduction à la stabilité hydrodynamique.

MAAJ 5409 [0.5 credit] (formerly 89.549)
(MCG 5552)
Théorie de Turbulence
Révision des théories fondamentales et des résultats expérimentaux des théorie isotropique locale. Turbulence isotropique, contrainte homogène des écoulements, écoulements turbulents dans les tuyaux et les canaux, jets, sillages, couches limites. Diffusion turbulente. Modèles de turbulence.

MAAJ 5500 [0.5 credit] (formerly 89.550)
(MCG 5557)
Méthodes Numériques en Mécanique des Fluides
Équations primitives. Méthodes de différences finies. Méthodes intégrales. Critère de stabilité. Calcul des écoulements transitoires laminaires tri-dimensionnels. Méthodes MAC de Los Alamos. Calcul des écoulements multidimensionnels turbulents. Modèles de turbulence. Méthode numérique de Gosman.

MAAJ 5501 [0.5 credit] (formerly 89.551)
(MCG 5151)
Laminar Flow Theory
Derivation and exact solutions of the Navier-Stokes equations. Low Reynolds number flows, Stokes flow. Oseen flow, lubrication theory. Laminar boundary layers. Introduction to hydrodynamic stability.

MAAJ 5502 [0.5 credit] (formerly 89.552)
(MCG 5152)
Theory of Turbulence
Review of the basic theories and experimental results of turbulent flow. Universal equilibrium theory, locally isotropic theories, isotropic turbulence, homogeneous shear flow, turbulent pipe and channel flow, jets, wakes, boundary layers. Turbulent diffusion of passive contaminants. Modeling of turbulence.

MAAJ 5505 [0.5 credit] (formerly 89.555)
(MCG 5155)
Inviscid Flow Theory
Langrangian and Eulerian description of fluid motion. Euler equations, velocity potential, irrotational flow, stream function, singular flows. Conformal mapping, Schwarz-Christoffel theorems. Airfoil theory, circulation and lift.

MAAJ 5506 [0.5 credit] (formerly 89.556)
(MCG 5156)
Measurement in Fluid Mechanics
Review of the common experimental techniques used in fluid mechanical research and applications. Flow visualization techniques. Hot-wire anemometry. Laser-Doppler anemometry. Measurement of concentration, temperature, force, pressure.

MAAJ 5507 [0.5 credit] (formerly 89.557)
(MCG 5157)
Numerical Computation of Fluid Dynamics and Heat Transfer
Governing equations. Explicit, implicit, finite difference and control volume procedures for approximating the parabolic and elliptic sets of partial differential equations and boundary conditions. Numerical solution by direct and iterative Gauss-Seidel relaxation methods. Considerations of stability, convergence, and numerical diffusion. Computational problems.

MAAJ 5508 [0.5 credit] (formerly 89.558)
(MCG 5158)
Industrial Fluid Mechanics
Application of simple flows to analysis of more complex systems. Pipe and duct systems, flow separation and control, aerosols, separation of particulates from flow, cavitation, unsteady flow.

MAAJ 5509 [0.5 credit] (formerly 89.559)
(MCG 5159)
Advanced Production Planning and Control
The principles of production management. Methods engineering, manufacturing control. Recording and evaluation of operations. Financial and production planning. Inventory control. Automation. Factory planning.

MAAJ 5601 [0.5 credit] (formerly 89.561)
(MCG 5161)
Environmental Engineering
Thermodynamic considerations. Physiological reactions of humans to different environments. Principles of ventilation, distribution and cleaning of air. Illumination and acoustics.

MAAJ 5608 [0.5 credit] (formerly 89.568)
(MCG 5168)
Industrial Organization
Principles of organization. Production processes. Organization and planning production. Evaluation of production activities. The economics of production. Planning for economy. Information engineering. Standardization.

MAAJ 5609 [0.5 credit] (formerly 89.569)
(MCG 5169)
Advanced Topics in Reliability Engineering
Overview of classical reliability concepts. Fault tree construction and evaluation. Common-cause failure analysis of engineering systems. Human reliability modeling in engineering systems. Human unreliability data banks. Three state device systems. Delta-star and Mellin transforms reliability determination techniques. Models to compute reliability of on-surface transportation vehicles. Reliability techniques applications in advanced engineering systems.

MAAJ 5700 [0.5 credit] (formerly 89.570)
(MCG 5170)
CAD/CAM
History and current technologies of CAD/CAM. Design software; graphical representation analysis, and optimization. Parameter design and software integration. Course is project oriented.

MAAJ 5701 [0.5 credit] (formerly 89.571)
(MCG 5171)
Applied Reliability Theory
Coherent systems. Paths and cuts representation. State-space representation. Observability and controllability. Failure rate. Repair time. System reliability estimation: binomial model. Strength stress model. Failure detection and isolation. Multiple sensors. Model based methods. Expert system approach. Analytical redundancy. Applications.

MAAJ 5702 [0.5 credit] (formerly 89.572)
(MCG 5172)
Introduction to Management of Automation (Robotics and Numerical Control)
Administrative concept of automation, robotics and numerical control; elements of flexible manufacturing systems. Process design in automation. Role of automation in the administration of manufacturing and project engineering. Optimization in the design of computer assisted manufacturing (CAM). State of art review.

MAAJ 5703 [0.5 credit] (formerly 89.573)
(MCG 5173)
Systems Engineering and Integration
State space representation. Observability, controllability, state estimation. Parameter identification. Steady-state and transient performance. Stability. Monitoring and regulation. Discretization effects. System integration. Bandwidth coordination. Technological systems design examples.

MAAJ 5706 [0.5 credit] (formerly 89.576)
(MCG 5176)
Industrial Control Systems
Concept, analysis and design of classical and modern industrial control systems. Computer based control systems for robotics, automation, manufacturing and instrumentation applications. Design project of industrial control and automation systems. Not accessible to students who have taken MCG 4108.

MAAJ 5707 [0.5 credit] (formerly 89.577)
(MCG 5177)
Robot Mechanics
Robotics overview. Transformations. Basics of robot kinematics, statics and dynamics. Introduction to practical robots, control and programming. Project in analysis, design or application of manipulators. Not accessible to students who have taken MCG 4132.

MAAJ 5708 [0.5 credit] (formerly 89.578)
(MCG 5178)
Advanced Topics in CAD/CAM
Overview of totally integrated CAD/CAM systems. Details of design and manufacturing software tools. Methods of linking design and manufacturing tools to form an integrated CAD/CAM system. Students will undertake projects that will provide them with hands-on experience.

MAAJ 5709 [0.5 credit] (formerly 89.579)
(MCG 5179)
Flexible Manufacturing
Types of manufacturing systems. The concept of flexible manufacturing. Overview of the basic components of flexible manufacturing systems: NC machine tools, programmable manipulators, guided vehicles, storage and retrieval warehouses. Machine cells. System layout and reliability. Group technology. Workpieces and tools routing. Operations sequencing.

MAAJ 5800 [0.5 credit] (formerly 89.580)
(MCG 5180)
Advanced Topics in Composite Materials
Computer automated manufacturing techniques. Advanced topics in lamination theory. Interlaminar stresses and free edge effects. Lamina and laminate failure theories. Principles of non-destructive testing including damage assessment. Mechanics and failure of particle, flake, thermoplastic and metal matrix composites.

MAAJ 5801 [0.5 credit] (formerly 89.581)
(MCG 5181)
Advanced Vibrations
Kinematics of vibrations, the single-degree-of-freedom system, without and with damping, two degrees of freedom, several degrees of freedom, vibration of shafts, critical speeds, complex presentation, influence coefficients, matrix method, stability of solution, approximate methods.

MAAJ 5802 [0.5 credit] (formerly 89.582)
(MCG 5182)
Theory of Elastic Instability
Considerations of instability with respect to small deformation. Differential equations for linear elements. Conservative and non-conservative force systems. Energy methods. Instability in beams. Instability of elements curved in a plane. Applications of trigonometric series. Stability of linear members in the inelastic zone.

MAAJ 5805 [0.5 credit] (formerly 89.585)
(MCG 5185)
Multivariable Digital Control
Quantization. Z-Transform. State equations. Jordan canonical form. Multirate and nonsynchronous samplings. Controllability and observability of digital systems. Digital controllers design using bilinear transformation. Digital PID controller. Stability. Optimal control of digital systems. Examples of controlling mechanical system actuators.

MAAJ 5806 [0.5 credit] (formerly 89.586)
(MCG 5186)
Non-Linear Discontinuous Dynamics and Control
Hamiltonian dynamics. Hamiltonian control systems. Lyapunov dynamics. Decoupling. Phase space analysis. Switching and sliding mode control. Boundary layer continuous approximation. Actuator, sensors and controller requirements. Manipulation control examples.

MAAJ 5901 [0.5 credit] (formerly 89.591)
(MCG 5191)
Combustion in Premixed Systems
Stoichiometry, thermo-chemistry, ignition, flame propagation, flame stabilization, diffusion flames, turbulent combustion, modeling.

MAAJ 5902 [0.5 credit] (formerly 89.592)
(MCG 5192)
Combustion in Diffusion Systems
Gaseous jet flames, combustion of liquid droplets, atomization, spray flames, coal combustion, fluidized bed combustion.

MCG 6000
Mechanical Engineering Report
For students in the course work master's program working on the Engineering Report.

MCG 7999
M.A.Sc. Thesis
For students working towards their master's thesis.

MCG 9997
Preparation for Ph.D. Thesis Proposal
Following completion of the comprehensive examination, registration required for all Ph.D. candidates until the thesis proposal is accepted by the advisory committee.

MCG 9998
Preparation for Ph.D. Comprehensive Examination
Registration required for all Ph.D. candidates until the comprehensive examination is passed.

MCG 9999
Ph.D. Thesis
For students working towards the Ph.D. thesis.

School for Studies in Art and Culture: Music

Loeb Building A911
Telephone: (613) 520-5770
Fax: (613) 520-3905
Web site: www.carleton.ca/artandculture/
music.html

The School

St. Patrick's Building 423

Director, Bryan Gillingham

Assistant Director (Music), Jennifer Giles

Music offers courses at the graduate level in musicology and ethnomusicology. These include courses offered in cooperation with the School of Canadian Studies. Full use is made of the resources of the National Library, the Public Archives, and the National Museum of Civilization.

Dr. Elaine Keillor is a lecturer in Canadian music with Dr. Helmut Kallmann (former Chief Music Librarian, National Library) as Adjunct Professor.

Courses in the sociology and aesthetics of music are offered by Dr. John Shepherd and Dr. Geraldine Finn.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

MUSI 5001 [0.5 credit] (formerly 30.501)
Theories of Music as Culture
A survey of major theories in musicology, ethnomusicology, feminism, semiotics, structuralism, poststructuralism, cultural studies and psychoanalysis as they have been applied to the understanding of the culture-specific character of sound in music.
Prerequisite: Permission of the School for Studies in Art and Culture (Music).

MUSI 5005 [0.5 credit] (formerly 30.505)
Feminism and Musicology
Applying specific feminist approaches, this course focuses upon recent developments in psychoanalytic theory, deconstruction and post-colonial criticism to examine the structures and significances of music in contemporary culture and its relationship to politics, ideology, and power.
Prerequisite: Permission of the School for Studies in Art and Culture (Music).

MUSI 5100 [1.0 credit] (formerly 30.510)
History of Canadian Music I
Selected aspects of notated Canadian music from 1600 to the present; liturgical music; social and economic conditions of Canadian musical life; regional studies; individual composers and performers.
Prerequisite: Permission of the School for Studies in Art and Culture (Music).

MUSI 5101 [0.5 credit] (formerly 30.511)
History of Canadian Music II
Anglo- and Franco-folk music traditions in Canada, past and present.
Prerequisite: Permission of the School for Studies in Art and Culture (Music).

MUSI 5102 [0.5 credit] (formerly 30.512)
History of Canadian Music III
The music of various ethnic minorities in Canada with special emphasis on the traditions of the First Peoples.
Prerequisite: Permission of the School for Studies in Art and Culture (Music).

MUSI 5105 [0.5 credit] (formerly 30.515)
History of Canadian Music IV
A survey of the history of French-Canadian popular music from the beginnings of Nouvelle France to the present. Special attention is paid to the social and political contexts of music making in Quebec.
Prerequisites: Permission of the School for Studies in Art and Culture (Music). A good reading ability in French is essential.

Neuroscience

Life Sciences Research Building 325
Telephone: (613) 520-4017
Fax: (613) 520-3667
E-mail: kim_cook@carleton.ca

The Institute

Director, B.A. Pappas

Neuroscience is a dynamic academic discipline that includes physiological, anatomical, biochemical, and behavioural studies of the nervous system. At Carleton University, graduate neuroscience research and training are coordinated by the Institute of Neuroscience. Both M.Sc. and Ph.D. degrees, with a Specialization in Behavioural Neuroscience, are offered through either the Departments of Psychology or Biology with supervision by one of the faculty members of the Institute.

Members of the Institute

- Hymie Anisman, *Stress, Brain-Immune Interactions, Depression*

- Jennifer Arnold, *Neuronal Apoptosis, Gap Junctions* (Adjunct)

- Steffany Bennett, *Neurodegeneration, Apoptosis* (Adjunct)

- James Cheetham, *Membrane Biochemistry, Neurotransmitter Release*

- Bruce Hutcheon, *Computational Neuroscience, Electrophysiology, Neurodegeneration* (Adjunct)

- Jack Kelly, *Central Auditory System, Electrophysiology and Behaviour*

- Dan McIntyre, *Epilepsy, Kindling, Learning and Memory*

- Zul Merali, *Peptides, Feeding Behaviour* (Adjunct)

- Bruce Pappas, *Brain Development, Dementia, Ischemia*

- Carlos Plata-Salaman, *Cytokines, Cachexia, Brain Trauma* (Adjunct)

- Michael Poulter, *Electrophysiology, Neurochemistry, Molecular*

- Arun Ravindran, *Neurobiology of Depression and Dysthymia, Brain/Immune System Interactions* (Adjunct)

- Shu Hui Wu, *Auditory Brainstem, Brain Slice Neurophysiology*

- Robert M. Zacharko, *Intracranial Self-stimulation, Stress, Depression, Dopamine, Anhedonia*

Specialization in Behavioural Neuroscience

Coordinator of the Specialization, B.A. Pappas

Application for admission, scholarships, and teaching assistantships should be made through either the Departments of Psychology or Biology, whichever is most appropriate to a student's research interest, and should indicate the intention to specialize in behavioural neuroscience. This specialization is a collaboration of the Departments of Biology and Psychology at Carleton University, the School of Psychology at the University of Ottawa and the Institute of Mental Health Research (Psychiatry) at the University of Ottawa. It is intended to augment the research and training which the student receives and to provide opportunity in clinical neuroscience.

Master's Program

Admission Requirements

The requirements for admission to the master's neuroscience specialization are as follows:

- Prior admission to the master's program of the Psychology or Biology department.

- A letter of recommendation to the Director of the Institute from a faculty member of the Institute of Neuroscience, indicating the willingness of the faculty member to supervise the candidate's research program.

- Recommendation of admission by the graduate committee representative(s) from the Institute of Neuroscience faculty.

Students with less than a high honours average in their undergraduate and graduate courses will not normally be recommended for admission.

Program Requirements

- Fulfillment of the requirements of the master's program of either Psychology or Biology Department

- Successful completion of PSYC 5200 (BIOL 5304)

- Thesis research must concern a neuroscience topic and be supervised by a member of the Institute

Doctor of Philosophy

Admission Requirements

Admission requirements to the Ph.D. neuroscience specialization are as follows:

- Prior admission to the Ph.D. program of the Psychology or Biology department.

- A letter of recommendation from a participating faculty member of the neuroscience specialization, indicating the willingness of the faculty member to supervise the candidate's research program

- Recommendation of admission by the graduate committee representative(s) from the Institute of Neuroscience faculty.

- Students with less than a high honours standing in their undergraduate and graduate courses will not normally be recommended for admission.

Program Requirements

Fulfillment of the requirements of the Ph.D. program of either the Psychology or Biology Department. A credit in Neuroscience Techniques (PSYC 6204) may be substituted for one of the following 0.5 credit courses normally required to satisfy the Psychology Ph.D. program requirements in statistics: PSYC 5401, PSYC 5402, PSYC 5403, PSYC 5406

- Successful completion of PSYC 5200 (BIOL 5304), PSYC 6200 (BIOL 6303) and at least one credit in PSYC 6204 (BIOL 6204)

Thesis research must concern a neuroscience topic and be supervised by a member of the Institute.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Neuroscience courses are available through the primary departments. Course offerings vary slightly from year to year and a complete listing can be obtained from the specialization coordinator.

The following are the core courses of the curriculum.

PSYC 5200 [1.0 credit] (formerly 49.520)
(BIOL 5304, formerly 61.534)
Basics of Neuroscience
A comprehensive neuroscience course from cellular levels to neural systems and behaviour. Topics covered will include aspects of neuroanatomy, neurophysiology, neuro-pharmacology and behavioural and cognitive neuroscience. (Also listed as PSY 6201 at the University of Ottawa)

PSYC 6200 [1.0 credit] (formerly 49.620)
(BIOL 6303, formerly 61.633)
Advanced Seminar in Neuroscience
A seminar focusing on the active research areas and interests of faculty, guest lecturers and graduate students and as well current trends in diverse areas of neuroscience.

PSYC 6204 [0.5 credit] (formerly 49.624)
(BIOL 6204, formerly 61.624)
Neuroscience Techniques
Completion of a research project carried out under the supervision of a neuroscience faculty member. The student will learn a new neuroscience technique and apply it to a research objective. May be repeated for different projects. Students must obtain approval from the Director of the Neuroscience Specialization.

PSYC 6300 [0.5 credit] (formerly 49.630)
Special Topics in Psychology
An in-depth study of current topics in neuroscience. Course content varies yearly and has recently included cognitive neuroscience, neuropharmacology, neurodegeneration, behavioural medicine and molecular neuroscience.

Philosophy

Dunton Tower 2123
Telephone: (613) 520-2110
Fax: (613) 520-3962
Web site: www.carleton.ca/philosophy/

The Department

Chair of the Department, Jay Drydyk

Supervisor of Graduate Studies, Marvin Glass

The Department of Philosophy offers programs of study leading to the degree of Master of Arts.

Qualifying-Year Program

Applicants who do not hold an Honours degree (or the equivalent) will be required to register in a qualifying-year program before proceeding to the master's program.

The regulations governing the qualifying year are outlined in the General Regulations section of this Calendar.

Master of Arts

Admission Requirements

The minimum requirement for admission to the master's program is an Honours B.A. degree (or the equivalent) in Philosophy, with at least B+ standing (or the equivalent). Qualifying-year and M.A. applicants from an institution other than Carleton University must submit two papers.

Program Requirements

The specific program requirements for master's candidates are the following:

- PHIL 5800;
- A thesis equivalent to 2.0 credits, which must be defended at an oral examination; or a research essay equivalent to 1.0 credit;
- 2.0 credits (or 3.0 in the case of students following the research essay option), a minimum of 1.0 by tutorial, in at least three of the following study areas: studies in the history of philosophy; studies in the work of an individual philosopher; studies in logic, epistemology, or metaphysics; studies in selected problems in philosophy.

Guidelines for Completion of Master's Degree

Full-time students enrolled in the 5.0 credit M.A. program are expected to complete PHIL 5800 and 2.0 credits by the end of the second term of study. The thesis or research essay approval form should be submitted by the end of the fourth week of the third term of study. Those students choosing the research essay option should complete 1.0 additional credits by the end of the third term of study. All full-time students are expected to submit the thesis or research essay by the end of the fourth term of study.

Part-time students enrolled in the 5.0 credit M.A. program are expected to complete PHIL 5800 and 2.0 credits by the end of the third year of study. The thesis or research essay approval form should be submitted by the end of the second month of the fourth year of study. Those students choosing the research essay option should complete 1.0 additional credit by the end of the fourth year of study. All part-time students are expected to submit the thesis or research essay by the end of the fifth year of study.

Other Courses

A maximum of 1.0 credit may be selected from courses offered at the 4000-level, or in a related field, or at another university.

Each year, the department offers 4000-level undergraduate 0.5 credit courses, which are open to students in the qualifying year and, with permission, to students in the M.A. program. For courses offered in 2002-2003, please consult the Undergraduate Calendar.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Tutorial Courses

PHIL 5004 [0.5 credit] (formerly 32.504)
Tutorial in the History of Philosophy I
Detailed study of a period or issue in the history of philosophy.

PHIL 5005 [0.5 credit] (formerly 32.505)
Tutorial in the History of Philosophy II
Detailed study of a period or issue in the history of philosophy.

PHIL 5104 [0.5 credit] (formerly 32.514)
Tutorial in the Work of an Individual Philosopher I
A critical and systematic study of the work of an individual philosopher.

PHIL 5105 [0.5 credit] (formerly 32.515)
Tutorial in the Work of an Individual Philosopher II
A critical and systematic study of the work of an individual philosopher.

PHIL 5204 [0.5 credit] (formerly 32.524)
Tutorial in Logic, Epistemology, or Metaphysics I
An attempt to find a solution to a specific problem in logic, epistemology, or metaphysics.

PHIL 5205 [0.5 credit] (formerly 32.525)
Tutorial in Logic, Epistemology, or Metaphysics II
An attempt to find a solution to a specific problem in logic, epistemology, or metaphysics.

PHIL 5304 [0.5 credit] (formerly 32.534)
Tutorial in Selected Problems of Philosophy I
An attempt to find a solution to a specific problem in some area other than logic, epistemology, or metaphysics.

PHIL 5305 [0.5 credit] (formerly 32.535)
Tutorial in Selected Problems of Philosophy II
An attempt to find a solution to a specific problem in some area other than logic, epistemology, or metaphysics.

Seminar Courses

PHIL 5100 [0.5 credit] (formerly 32.510)
Advanced Problems in Legal Philosophy
Studies in legal theory and analyses of law advanced by Hart, Dworkin, and others, and legal concepts: for example, principles, rights, duties, liability, etc. Precise course content will vary from year to year and will be announced at the beginning of the term. (Also listed as LAWS 5100.)
Prerequisites: PHIL 3101 and PHIL 3102 (LAWS 3101 and LAWS 3102), or permission of the relevant department.

PHIL 5200 [0.5 credit] (formerly 32.520)
Seminar in Philosophy of Mind and/or Philosophical Semantics
A detailed study of an issue or the work of selected philosophers in the general area of philosophy of mind and/or philosophical semantics. Also offered at the undergraduate level, with different requirements, as PHIL 4103 or PHIL 4104, for which additional credit is precluded.

PHIL 5300 [0.5 credit] (formerly 32.530)
Seminar in Value Theory
A detailed study of an issue or the work of selected philosophers in the general area of value theory. Also offered at the undergraduate level, with different requirements, as PHIL 4105 or PHIL 4106, for which additional credit is precluded.

PHIL 5400 [0.5 credit] (formerly 32.540)
Seminar in German Idealism, Its Influence and/or Reactions to It
A detailed study of an issue or the work of selected philosophers in the general area of German idealism, its influence and/or reactions to it. Also offered at the undergraduate level, with different requirements, as PHIL 4006, for which additional credit is precluded.

PHIL 5800 [1.0 credit] (formerly 32.580)
Graduate Seminar
The first term will be devoted to a single issue or group of interrelated issues. In the second term, a variety of topics will be discussed. Issues covered in this course will vary from year to year.

PHIL 5908 [1.0 credit] (formerly 32.598)
Research Essay

PHIL 5909 [2.0 credits] (formerly 32.599)
M.A. Thesis

Ottawa-Carleton Institute for Physics

Université d'Ottawa
University of Ottawa
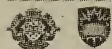
Carleton University

2240 Herzberg Building
Telephone: (613) 520-3515
Fax: (613) 520-5613
E-mail: grad_supervisor@physics.carleton.ca
Web site: www.ocip.carleton.ca

The Institute

Director of the Institute, Richard Hodgson

Associate Director, Gerald Oakham

Students pursuing studies in physics at the M.Sc. and Ph.D. levels in the Ottawa area do so in a cooperative program that combines the resources of the Departments of Physics of Carleton University and the University of Ottawa. The two universities have a joint committee supervising the programs, regulations, and student admissions.

Students are admitted for graduate work under the general regulations of the Institute, which include criteria related to academic performance, research experience, and referees' appraisals. The choice of program and/or research project and supervisor will determine the student's primary campus location.

At Carleton, the research areas of physics available for programs leading to the M.Sc. or the Ph.D. degree include high-energy physics and medical physics. In high-energy physics, both theoretical and experimental programs are available. At the University of Ottawa, the research interests include condensed matter physics, biophysics, non-linear dynamics, statistical mechanics, materials science, photonics, and surface physics. The graduate courses offered on the two campuses match this complementarity of research interests, and the courses listed below are therefore grouped to reflect the different emphases on the two campuses.

In addition, the M.Sc. degree in the area of physics in modern technology is offered at both campuses. This program requires a work term placement rather than a thesis.

The list below of all members of the Institute along with their research interests can be used as a guide to possible supervisors. For students in the medical physics stream, research supervision may be provided by members of other institutions in the area, such as hospitals, cancer clinics, and government laboratories.

Requests for information and completed applications should be sent to the Director or Associate Director of the Institute. Detailed information is available at our Web site.

Members of the Institute

The home department of each member of the Institute is indicated by (C) for the Department of Physics, Carleton University and (O) for the Department of Physics, University of Ottawa.

- J.C. Armitage, *High Energy Physics, Instrumentation* (C)

- Xiaoyi Bao, *Photonics* (O)

- Alain Bellerive, *Splar Neutrino Physics* (C)

- Ian Calder, *Experimental Condensed Matter* (O-Adjunct)

- Ian Cameron, *Medical Physics* (C-Adjunct)

- R.K. Carnegie, *Experimental High Energy Physics* (C)

- Sylvain Charbonneau, *Semiconductor Physics* (O-Adjunct)

- Liang Chen, *Theoretical Condensed Matter, Photonics* (O)

- R.L. Clarke, *Medical Physics* (C-Adjunct)

- Joanna Cygler, *Medical Physics* (C-Adjunct)

- Robert deKemp, *Medical Physics* (C-Adjunct)

- Serge Desgreniers, *High Pressure Physics* (O)

- Marie D'Iorio, *Condensed Matter* (O-Adjunct)

- Madhu Dixit, *Experimental High Energy Physics* (C-Adjunct)

- Simon Fafard, *Semiconductor Physics* (O-Adjunct)

- Emery Fortin, *Semiconductor Physics* (O)

- L.H. Gerig, *Medical Physics* (C-Adjunct)

- Stephen Godfrey, *Theoretical Particle Physics* (C)

- C.L. Greenstock, *Medical Physics* (C-Adjunct)

- C.K. Hargrove, *Experimental High Energy Physics* (C-Adjunct)

- Pawel Hawrylak, *Theoretical Condensed Matter* (O-Adjunct)

- R.J. Hemingway, *Experimental High Energy Physics* (C-Adjunct)

- R.J.W. Hodgson, *Theoretical Nuclear Physics* (O)

- B.J. Jarosz, *Medical Physics* (C)

- P.C. Johns, *Medical Physics* (C)

- Béla Joós, *Theoretical Condensed Matter* (O)

- Pat Kalyniak, *Theoretical Particle Physics* (C)

- Dean Karlen, *Experimental High Energy Physics* (C)

- Gilles Lamarche, *Low Temperature Physics* (O-Adjunct)

- M.A.R. LeBlanc, *Superconductivity* (O)

- Ivan L'Heureux, *Nonequilibrium Processes in Nonlinear Systems* (O)

- B.A. Logan, *Nuclear Physics* (O)

- André Longtin, *Nonlinear Dynamics, Biophysics* (O)

- Barry McKee, *Medical Physics* (C-Adjunct)

- H.J.A.F. Mes, *Experimental High Energy Physics* (C-Adjunct)

- Cheng Ng, *Medical Physics* (C-Adjunct)

- Tony Noble, *Experimental High Energy Physics* (C-Adjunct)

- F.G. Oakham, *Experimental High Energy Physics* (C)

- Peter Piercy, *Condensed Matter Physics* (O)

- G.P. Raaphorst, *Medical Physics* (C-Adjunct)

- D.G. Rancourt, *Solid State Magnetism* (O)

- D.W.O. Rogers, *Medical Physics* (C-Adjunct)

- Alain Roth, *Condensed Matter* (O-Adjunct)

- Giles Santyr, *Medical Physics* (C)

- Ken Shortt, *Medical Physics* (C-Adjunct)

- W.D. Sinclair, *Solar Neutrino Physics* (C)

- G.W. Slater, *Polymer Physics* (O)

- A.K.S. Song, *Theoretical Studies in Solid State* (O-Adjunct)

- Z.M. Stadnik, *Electronic Structure and Magnetism* (O)

- M.K. Sundaresan, *Theoretical Particle Physics* (C)

- John Tse, *Theoretical Material Sciences* (O-Adjunct)

- Y.P. Varshni, *Theoretical Solid State, Astrophysics* (O)

- P.J.S. Watson, *Theoretical Particle Physics* (C)

- A.J. Walker, *Medical Physics* (C-Adjunct)

- Robyn Williams, *Semiconductor Physics* (C-Adjunct)

- J.C. Woolley, *Semiconductor Physics* (O)

Master of Science

An Honours B.Sc. in Physics or a closely related field at a standard acceptable to the two universities is normally required for admission to the M.Sc. program. The admissions committee may require students to take an orientation examination during the first weeks of residence. The results of this examination may indicate the need for a student to register in undergraduate courses to fill gaps in his/her knowledge. It is strongly recommended that all students have had at least one course in computing.

Program Requirements

The options for the M.Sc. program are described below. Normally the requirements for the research M.Sc. with thesis will consist of:

- 2.5 credits of course work

- A thesis (2.5 credits) defended at an oral examination

- Participation in the seminar series of the Institute

Students with academic preparation particularly well suited for their chosen field of study may have their course credit requirements reduced to 2.0 credits. In this case, a 3.0-credit thesis will be required.

The minimum number of courses is 1.5 credits. At least 1.0 credit must consist of lecture courses at the graduate level. The courses PHYS 5900 and PHYS 5901 are courses on Selected Topics, normally given as directed studies, and cannot fulfil this lecture course requirement. Most students will be expected to take PHYS 5002, or another equivalent computing physics course. Students in experimental, theoretical, or high-energy physics streams will normally include PHYS 5601, PHYS 5602, PHYS 5701 and PHYS 5702 among their courses.

For the medical physics stream the three areas of specialization are: imaging, therapy, and biophysics. All students are required to take PHYS 5203 and 0.5 credit appropriate physics course from an area of physics other than medical physics. In addition:

- For imaging, PHYS 5204 is required

- For therapy, PHYS 5206 is required

- For biophysics, 0.5 credit chosen from PHYS 5207, cell biology, physiology or anatomy is required

Students with a medical/health physics background may have the selection of required courses adjusted to reflect their preparation and may receive advanced standing for equivalent courses.

A selection from PHYS 5208, PHYS 5209, or, (with approval) other appropriate courses in physics, engineering, computer science, business or law can be used to complete the program.

In special cases, the requirements may also be met by taking 5.0 credits of course work and no thesis. 1.0 credit must be the selected topics course PHYS 5900. A comprehensive examination and participation in the seminar series will also be required.

Students in the physics in modern technology stream must successfully complete the following requirements:

- 3.0 credits of course work

- PHYS 5905

- Students will normally include two of PHYS 5002, PHYJ 5003, PHYJ 5004, PHYJ 5005 among their courses.

Students enrolled in the physics in modern technology stream are required to complete a work term rather than a research thesis. Students in this stream who wish to pursue a research degree should consult with the graduate supervisor. Although every effort is made to find a work term position for every student enrolled in the physics in modern technology stream, no guarantee of employment can be made. To minimize the likelihood of a work term position not being found, enrolment will be limited to reflect the availability of work term placements. In the event that a work term placement cannot be found, students may fulfil the M.Sc. requirements with courses only as described above.

Candidates admitted to the M.Sc. program with more than the minimum course requirements may be permitted to credit towards the degree a maximum of 1.0 credit at the senior undergraduate level. This maximum does not apply to qualifying-year students.

Guidelines for Completion of Master's Degree

With the exception of those students in the physics in modern technology stream, full-time master's candidates are expected to complete all requirements in six terms of registered full-time study. Part-time master's candidates are expected to complete their degree requirements within an elapsed period of three to four calendar years after the date of initial registration.

Students in the physics in modern technology stream are normally expected to complete all their requirements in three successive terms of registered full-time study.

Doctor of Philosophy

Admission Requirements

An M.Sc. in Physics, or a closely related field, is normally required for admission into the Ph.D. program. Students who have been admitted to the M.Sc. program may be permitted to transfer into the Ph.D. program if they demonstrate academic abilities for advanced research in their field.

In exceptional cases, an outstanding student who has completed the honours B.Sc. will also be considered.

Program Requirements (from M.Sc.)

The normal requirements for the Ph.D. degree (after M.Sc.) are:

- A minimum of 2.0 credits at the graduate level

- Students who lack any of the relevant courses recommended for the M.Sc. program will be expected to have completed them (or the equivalents) by the end of their Ph.D. program. In addition, students in experimental, theoretical, high energy physics, or theoretical physics should complete PHYS 6601 and PHYS 6602, and students in medical physics should complete PHYS 5209.

- A comprehensive examination designed to demonstrate overall ability in physics and in the candidate's research area, normally within the first year of study. This takes the form of a written examination followed, if necessary, by an oral examination.

- A thesis which will be defended at an oral examination. The examining board for all theses will include members of the Institute from both Departments of Physics. The external examiner of the thesis will be external to both Departments of Physics.

- Participation in the seminar series of the Institute

Guidelines for Completion of Doctoral Degree

Full-time Ph.D. candidates admitted on the basis of an M.Sc. are expected to complete all requirements within an elapsed period of four to five years after the date of initial registration. Part-time Ph.D. candidates are expected to complete all requirements within an elapsed period of six years after the date of initial registration.

Residence Requirements

For the M.Sc. degree:

- At least one year of full-time study (or the equivalent)

For the Ph.D. degree (from B.Sc.):

- At least three years of full-time study (or the equivalent)

For the Ph.D. degree (from M.Sc.):

- At least two years of full-time study (or the equivalent)

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

University of Ottawa course numbers (in parentheses) follow the Carleton course number and credit information.

The following course is offered either at Carleton or the University of Ottawa:

PHYS 5701 [0.5 credit] (formerly 75.571) (PHY 5170)
Intermediate Quantum Mechanics with Applications
Angular momentum and rotation operations; Wigner and Racah coefficients; several and many electron problem in atoms; variational and Hartree-Fock formalism; introduction to second quantized field theory; scattering theory.
Prerequisites: PHYS 4707 and PHYS 4708 and permission of the Department.

The following courses are offered only at Carleton:

PHYS 5002 [0.5 credit] (formerly 75.502) (PHY 5344)
Computational Physics
Computational methods used in analysis of experimental data. Introduction to probability and random variables. Monte Carlo methods for simulation of random processes. Statistical methods for parameter estimation and hypothesis tests. Confidence intervals. Multivariate data classification. Unfolding methods. Examples taken primarily from particle and medical physics. Also offered at the undergraduate level, with different requirements, as PHYS 4807, for which additional credit is precluded. Prerequisite: An ability to program in FORTRAN, Java, C, or C++ and permission of the Department.

PHYS 5101 [0.5 credit] (formerly 75.511) (PHY 8111)
Classical Mechanics and Theory of Fields
Hamilton's principle; conservation laws; canonical transformations; Hamilton-Jacobi theory; Lagrangian formulation of classical field theory.
Prerequisite: Permission of the Department.

PHYS 5202 [0.5 credit] (formerly 75.522) (PHY 8122)
Special Topics in Molecular Spectroscopy
Topics of current interest in molecular spectroscopy. In past years, the following areas have been covered: electronic spectra of diatomic and triatomic molecules and their interpretation using molecular orbital diagrams; Raman and resonance Raman spectroscopy; symmetry aspects of vibrational and electronic levels of ions and molecules in solids; the presence of weak and strong resonant laser radiation. (Also listed as CHEM5009/CHM 8150).
Prerequisite: Permission of the Department.

PHYS 5203 [0.5 credit] (formerly 75.523) (PHY 5161)
Medical Radiation Physics
Basic interaction of electromagnetic radiation with matter. Sources: X-ray, accelerators, nuclear. Charged particle interaction mechanisms, stopping powers, kerma, dose. Introduction to dosimetry. Units, measurements, dosimetry devices.
Prerequisite: Permission of the Department.

PHYS 5204 [0.5 credit] (formerly 75.524) (PHY 5112)
Physics of Medical Imaging
Outline of the principles of transmission X-ray imaging, computerized tomography, nuclear medicine, magnetic resonance imaging, and ultra-sound. Physical descriptors of image quality, including contrast, resolution, signal-to-noise ratio, and modulation transfer function are covered and an introduction is given to image processing.
Prerequisites: PHYS 5203 and PHYS 4203, or permission of the Department.

PHYS 5206 [0.5 credit] (formerly 75.526) (PHY 5164)
Medical Radiotherapy Physics
Terminology and related physics concepts. Bragg-Gray, Spencer-Attix cavity theories, Fano's theorem. Dosimetry protocols, dose distribution calculations. Radiotherapy devices, hyperthermia.
Prerequisite: PHYS 5203 and permission of the Department.

PHYS 5207 [0.5 credit] (formerly 75.527) (PHY 5165)
Radiobiology
Introduction to basic physics and chemistry of radiation interactions, free radicals, oxidation and reduction, G values. Subcellular and cellular effects: killing, repair, sensitization, protection. Measurement methods. Survival curve models. Tissue effects, genetic and carcinogenic effects, mutations, hazards. Cancer therapy. Radiation protection considerations.
Prerequisite: PHYS 5203 must have been taken, or be taken concurrently and permission of the Department.

PHYS 5208 [0.5 credit] (formerly 75.528)
(PHY 5163)
Radiation Protection
Biophysics of radiation hazards, dosimetry and
instrumentation. Monitoring of sources, planning
of facilities, waste management, radiation safety,
public protection. Regulatory agencies.
Prerequisite: PHYS 5203 and permission of the
Department.

PHYS 5209 [0.5 credit] (formerly 75.529)
(PHY 5166)
Medical Physics Practicum
Hands-on experience with current clinical
medical imaging and cancer therapy
equipment, and dosimetry and biophysics
instrumentation. The course requires completion
of experimental projects on medical imaging,
radiotherapy, dosimetry, and biophysics,
conducted at local clinics and NRC laboratories.
Prerequisites: PHYS 5203. Also, as appropriate
to the majority of projects undertaken, one of
PHYS 5204, PHYS 5206, PHYS 5207, or other
biophysics courses, or permission of the
Department.

PHYS 5302 [0.5 credit] (formerly 75.532)
(PHY 8132)
Classical Electrodynamics
Covariant formulation of electrodynamics;
Lenard-Wiechert potentials; radiation reaction;
plasma physics; dispersion relations.
Prerequisite: PHYS 4307 and permission of the
Department.

PHYS 5601 [0.5 credit] (formerly 75.561)
(PHY 5966)
**Experimental Techniques of Nuclear and
Elementary Particle Physics**
The interaction of radiation and high energy
particles with matter; experimental methods of
detection and acceleration of particles; use of
relativistic kinematics; counting statistics.
Prerequisites: PHYS 4307 and PHYS 4707 and
permission of the Department.

PHYS 5602 [0.5 credit] (formerly 75.562)
(PHY 5967)
Physics of Elementary Particles
Properties of leptons, quarks, and hadrons. The
fundamental interactions. Conservation laws;
invariance principles and quantum numbers.
Resonances observed in hadron-hadron
interactions. Three body phase space. Dalitz
plot. Quark model of hadrons, mass formulae.
Weak interactions; parity violation, decay of
neutral kaons; CP violation; Cabibbo theory. Also
offered at the undergraduate level, with different
requirements, as PHYS 4602, for which
additional credit is precluded.
Prerequisite: PHYS 4707 and permission of the
Department.

PHYS 5604 [0.5 credit] (formerly 75.564)
(PHY 8164)
Intermediate Nuclear Physics
Properties of the deuteron and the neutron-

proton force. Nucleon-nucleon forces, isospin
and charge independence. Nuclear models.
Scattering theory. Interpretation of n-p and p-p
scattering experiments. Interaction of nucleons
with electrons. Interaction of nuclei with radiation.
Prerequisite: PHYS 4608 and permission of the
Department.

PHYS 5702 [0.5 credit] (formerly 75.572)
(PHY 8172)
Relativistic Quantum Mechanics
Relativistic wave equations. Expansion of S
matrix in Feynman perturbation series. Feynman
rules. An introduction to quantum electro-
dynamics with some second quantization.
Gauge theories. May include introduction to
Standard Model.
Prerequisite: PHYS 5701 and permission of the
Department.

PHYS 5801 [0.5 credit] (formerly 75.581)
(PHY 5140)
Methods of Theoretical Physics I
This course and PHYS 5802 are designed for
students who wish to acquire a wide background
of mathematical techniques. Topics can include
complex variables, evaluation of integrals,
approximation techniques, dispersion relations,
Pade approximants, boundary value problems,
Green's functions, integral equations.

PHYS 5802 [0.5 credit] (formerly 75.582)
(PHY 5141)
Methods of Theoretical Physics II
This course complements PHYS 5801.Topics
include group theory, discussion of SU2, SU3,
and other symmetry groups. Lorentz group.

PHYS 5900T [1.0 credit] (formerly 75.590)
(PHY 8290)
Selected Topics in Physics (M.Sc.)
A student may, with the permission of the
Department, take more than one selected topic,
in which case each full course is counted for
credit.
Prerequisite: Permission of the Department.

PHYS 5901 [0.5 credit] (formerly 75.591)
(PHY 8191)
Selected Topics in Physics (M.Sc.)
Prerequisite: Permission of the Department.

PHYS 5905 [1.0 credit] (formerly 75.595)
(PHY 5495)
Physics in Modern Technology Work Term
Practical experience for students enrolled in
the physics in modern technology stream. To
receive course credit, students must receive
satisfactory evaluations for their work term
employment. Written and oral reports
describing the work term project are required.
Prerequisites: Registration in the physics in
modern technology stream of the M.Sc. program
and permission of the Department.

PHYS 5909 (formerly 75.599)
(PHY 7999)
M.Sc. Thesis
Prerequisite: Permission of the Department.

PHYS 6601 (formerly 75.661) (PHY 8161)
Particle Physics Phenomenology
This course covers much of the required knowledge for research in particle physics from both the experimental and theoretical points of view. Topics may include: standard model, parton model, quark model, hadron spectroscopy, and tests of QCD.
Prerequisite: PHYS 5602 and permission of the Department.

PHYS 6602 (formerly 75.662)
(PHY 8162)
Advanced Topics in Particle Physics Phenomenology
This course will consist of a variety of seminars and short lecture courses, and will cover topics of immediate interest to the research program of the department.
Prerequisite: Permission of the Department.

PHYS 6701 [0.5 credit] (formerly 75.671)
(PHY 8173)
Quantum Electrodynamics
Relativistic quantum field theory; second quantization of Bose and Fermi fields; reduction and LSZ formalism; perturbation expansion and proof of renormalizability of quantum electrodynamics; calculations of radiative corrections and applications.
Prerequisites: PHYS 5101, PHYS 5302, PHYS 5701 and PHYS 5702 and permission of the Department.

PHYS 6900 (formerly 75.690T)
(PHY 8490)
Selected Topics in Physics (Ph.D.)
Prerequisite: Permission of the Department.

PHYS 6901 (formerly 75.691)
(PHY 8391)
Selected Topics in Physics (Ph.D.)
Prerequisite: Permission of the Department.

PHYS 6909 (formerly 75.699)
(PHY 9999)
Ph.D. Thesis
Prerequisite: Permission of the Department.

The following courses are offered only at the University of Ottawa:

PHYJ 5001 (formerly 74.501)
(PHY 5130)
Experimental Characterization Techniques in Materials Science, Physics, Chemistry, and Mineralogy
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction. Spectroscopy. Microscopy and imaging. Other analytic techniques.
Prerequisite: Permission of the Department.

PHYJ 5003 (formerly 74.503)
(PHY 5342)
Computer Simulations in Physics
This course covers advanced numerical methods used to study large scale problems in the natural sciences, with emphasis on Molecular Dynamics, Langevin Dynamics and Brownian Dynamics methods. Examine the use of different thermodynamic ensembles, to compute experimentally relevant physical properties, and to work with non-equilibrium situations. Methods required to handle very large problems on parallel computers.
Prerequisite: PHY 3355 (PHY 3755), PHY 3370 (PHY 3770) and familiarity with FORTRAN, Pascal or C.

PHYJ 5004 (formerly 74.504)
(PHY 5340)
Computational Physics I
Deterministic numerical methods in physics. Interpolation methods. Numerical solutions of Newton's, Maxwell's and Schrödinger's equations. Molecular dynamics. Non-linear dynamics. Numerical solutions of partial differential equations in physics. Finite elements. This course cannot be combined for credit with PHY 4340 (PHY 4740).

PHYJ 5005 (formerly 74.505)
(PHY 5341)
Computational Physics II
Interpolation, regression and modeling. Random number generation. Monte Carlo methods. Simulations in thermo-statistics. Fractals, percolation, cellular automation. Stochastic methods. This course cannot be combined for credit with PHY 4341 (PHY 4741).

PHYJ 5006 (formerly 74.506)
(PHY 5362)
Computational Methods in Material Sciences
Introduction to modern computational techniques used in material science research. Classical molecular dynamics, classical and quantum Monte Carlo methods, plane-wave based electronic band structure calculations, Carr-Parrinello quantum molecular dynamics. Applications to condensed matter systems: basic simulation techniques, force-field based methods, first-principles quantum mechanical methods.
Prerequisite: Permission of the Department.

PHYJ 5102 (formerly 74.512)
(PHY 5361)
Nonlinear Dynamics in the Natural Sciences
Differential and difference equations, Fourier series and data analysis, stability analysis, Poincaré maps, local bifurcations, routes to chaos and statistical properties of strange attractors. Applications of these concepts to specific problems in condensed matter physics, molecular physics, fluid mechanics, dissipative structures, and evolutionary systems.
Prerequisite: Permission of the Department.

PHYJ 5308 [0.5 credit] (PHY 5384)
Physics of Fiber Optic Systems
Physics of electromagnetic waves in fiber-optic systems. Laser modulation, chirp effects, noise. Amplitude, frequency, phase modulation. Optical dispersion (chromatic dispersion, polarization mode dispersion and polarization-dependent losses). Fiber losses and nonlinear effects. Optical detectors, receivers, signal to noise ratio, power penalties. Overall system design.

PHYJ 5401 (formerly 74.541)
(PHY 5100)
Solid State Physics I
Periodic structures, Lattice waves. Electron states. Static properties of solids. Electron-electron interaction. Dynamics of electrons. Transport properties. Optical properties.
Prerequisite: Permission of the Department.

PHYJ 5402 (formerly 74.542)
(PHY 5110)
Solid State Physics II
Elements of group theory. Band structure, tight binding and other approximations, Hartree-Fock theory. Measuring the Fermi surface. Boltzmann equation and semiconductors. Diamagnetism, paramagnetism and magnetic ordering. Superconductivity.
Prerequisite: Permission of the Department.

PHYJ 5403 (formerly 74.543)
(PHY 5151)
Type I and II Superconductors
Flux flow and flux cutting phenomena. Clem general critical state model. Flux quantization, Abrikosov vortex model and Ginzburg-Landau theory. Superconducting tunnelling junctions (Giaevar and Josephson types).
Prerequisite: PHY 4370 and permission of the Department.

PHYJ 5404 (formerly 74.544)
(PHY 6371)
Topics in Mössbauer Spectroscopy
Recoilless emission/absorption, anisotropic Debye-Waller factors, second order Doppler shifts. Mössbauer lineshape theory with static and dynamic hyperfine interactions. Distributions of static hyperfine parameters. Physics of the hyperfine parameters: origin of the hyperfine field, calculations of electric field gradients. Applications of Mössbauer spectroscopy.
Prerequisite: Permission of the Department.

PHYJ 5407 (formerly 74.547)
(PHY 5380)
Semiconductor Physics I
Brillouin zones and band theory. E-k diagram, effective mass tensors, etc. Electrical properties of semiconductors. Conduction, hall effect, magneto-resistance. Scattering processes. Multivalley models and non-parabolic bands.
Prerequisite: PHY 4380 and permission of the Department.

PHYJ 5408 (formerly 74.548)
(PHY 5381/PHY 5781)
Semiconductor Physics II: Optical Properties
Optical constants and dispersion theory. Optical absorption, reflection and band structure. Absorption at band edge and excitons. Lattice, defect and free carrier absorption. Magneto-optics. Photo-electronic properties, luminescence, detector theory. Experimental methods.
Prerequisite: PHY 4380 and permission of the Department.

PHYJ 5409 (formerly 74.549)
(PHY 5951)
Low Temperature Physics II
Helium 3 and Helium 4 cryostats. Dilution refrigerators. Theory and techniques of adiabatic demagnetization. Thermometry at low temperatures. Problems of thermal equilibrium and of thermal isolation. Properties of matter at very low temperature.
Prerequisite: PHY 4355 and permission of the Department.

PHYJ 5501 (formerly 74.551)
(PHY 5125)
Charged Particle Dynamics
A course on the acceleration, transport and focusing of charged particles in vacuum using electric magnetic fields. Beam optics. Phase space of an assembly of particles. Applications to experimental systems.
Prerequisite: Permission of the Department.

PHYJ 5502 (formerly 74.552)
(PHY 5740)
Physique Numérique I
Méthodes numériques déterministes en physique. Techniques d'interpolation. Solutions numérique des équations de Newton, de Maxwell et de Schrödinger. Dynamique moléculaire. Dynamique non-linéaire. Solutions numériques des équations aux dérivées partielles en physique. Éléments finis.
Prerequisite: Permission of the Department.

PHYJ 5503 (formerly 74.553)
(PHY 5741)
Physique Numérique II
Interpolation, régression et modeler. Nombres aléatoires. Techniques de Monte-Carlo. Simulations thermo-statistiques. Percolation, fractales, et automisation cellulaire. Méthodes numériques stochastiques.
Prerequisite: Permission of the Department.

PHYJ 5504 (formerly 74.554)
(PHY 5387)
Physics of Materials
Microscopic characteristics related to the physical properties of materials. Materials families: metals and alloys, ceramics, polymers and plastics, composites, layered materials, ionic solids, molecular solids, etc. Specific materials groups. Equilibrium phase diagrams and their relation to microstructure and kinetics.

Experimental methods of characterization. Interactions and reactions.
Prerequisite: PHY 4382 or equivalent. Cannot be combined with PHY 4387.

PHYJ 5505 (formerly 74.555)
(PHY 5355)
Statistical Mechanics
Ensemble Theory. Interacting classical and quantum systems. Phase transitions and critical phenomena. Fluctuations and linear response theory. Kinetic equations.
Prerequisites: PHY 4370 and PHY 3355 and permission of the Department.

PHYJ 5506 (formerly 74.556)
(PHY 5742)
Simulations Numériques en Physique
Un cours ayant but d'étudier des méthodes numériques avancées employées dans les problèmes à grande échelle dans les sciences naturelles. Emploi d'ensembles thermodynamiques différents, calculs de propriétés physiques expérimentalement pertinentes, et extension aux situations hors d'équilibre. Techniques pour ordinateurs parallèles.
Prerequisite: Permission of the Department.

PHYJ 5507 (formerly 74.557)
(PHY 5922)
Advanced Magnetism
Study of some of the experimental and theoretical aspects of magnetic phenomena found in ferro-, ferri-, antiferro-magnetic and spin glass materials. Topics of current interest in magnetism.
Prerequisite: PHY 4385 and permission of the Department.

PHYJ 5508 (formerly 74.558)
(PHY 5320)
Introduction to the Physics of Macromolecules
The chemistry of macromolecules and polymers; random walks and the static properties of polymers; experimental methods; the Rouse model and single chain dynamics; polymer melts and viscoelasticity; the Flory-Huggins theory; the reptation theory; computer simulation algorithms; biopolymers and copolymers.
Prerequisite: Permission of the Department.

PHYJ 5509 (formerly 74.559)
(PHY 5347)
Physics, Chemistry and Characterization of Mineral Systems
The materials science of mineral systems such as the network and layered silicates. In-depth study of the relations between mineralogically relevant variables such as: atomic structure, crystal chemistry, site populations, valence state populations, crystallization conditions. Interpretation and basic understanding of characterization tools.
Prerequisite: Permission of the Department.

PHYJ 5603 (formerly 74.563)
(PHY 5310)
Ion Collisions in Solids
Energy loss of energetic particles in passing through solids. Stopping cross sections. The influence of crystal lattice on nuclear stopping. Crystal lattice effects at high energies. Channelling and blocking. The collision cascade. Charge states of fast ions in solids from thin foil and X-ray measurements.

PHYJ 5703 (formerly 74.573)
(PHY 6170)
Advanced Quantum Mechanics II
Systems of identical particles and many-body theory. Lattice and impurity scattering. Quantum processes in a magnetic field. Radiative and non-radiative transitions. Introduction to relativistic quantum mechanics.
Prerequisite: PHY 5170 and permission of the Department.

PHYJ 6406 (formerly 74.646)
(PHY 6382)
Physics of Semiconductor Superlattices
Fundamental physics of two-dimensional quantized semiconductor structures. Electronic and optical properties of superlattices and quantum wells. Optical and electronic applications. This course is intended for students registered for the Ph.D. in semiconductor physics research.
Prerequisite: Advanced undergraduate or graduate course in solid state physics and permission of the Department.

PHYJ 6407 (formerly 74.647)
(PHY 6782)
Physique des super-réseaux à semi-conducteurs
Physique fondamentale des structures quantiques bi-dimensionnelles à semiconducteurs. Propriétés électroniques et optiques des super-réseaux et puits quantiques. Applications à l'électronique et à l'optique. Ce cours est destiné aux étudiants et aux étudiantes inscrits au doctorat en physique des semiconducteurs.
Prerequisite: Permission of the Department.

Political Economy

Loeb Building A818
Telephone: (613) 520-7414
Fax: (613) 520-2154

Email: political_economy@carleton.ca

Web site: www.carleton.ca/polecon

The Institute

Director of the Institute, Rianne Mahon

The Institute of Political Economy, established in 1989, developed out of the Graduate Summer School of Political Economy, which was formed in 1983. The summer school was built on the strong tradition of interdisciplinary studies at Carleton, and on the interests of numerous faculty at Carleton involved in political economy. Distinguished international scholars have been attracted to teach in the summer school. Through the Institute, these distinguished visitors will now be in residence during the normal academic year, in addition to the summer program.

The Institute offers a program of study and research leading to the degree of Master of Arts in Political Economy, the only program of its kind in Canada. Its interdisciplinary program is designed to offer students both an exposure to the core concepts of political economy and an opportunity to develop individual areas of research concentration.

The program focuses on investigating the relationship between the economy and politics as they affect the social and cultural life of societies, and secondly, focuses on the historical processes whereby social change is located in the interaction of the economic, political, cultural, and ideological moments of social life.

Carleton University has developed a strong tradition in political economy. Faculty members from most of the social sciences and history participate regularly in the Institute. The program's curriculum includes courses with a political economy orientation that are offered by other departments, schools, and institutes. The Master of Arts in Political Economy is an opportunity for students to study political economy from the perspective of different disciplines within a single program.

Qualifying-Year Program

Applicants who have a general (3-year) bachelor's degree in one of the disciplines represented in the program may be admitted to a qualifying-year program designed to raise their status to that of honours graduates. Students are expected to achieve at least high honours in qualifying-year courses in order to be considered for admission to the master's program. To be eligible for admission to a qualifying year, normally a student must previously have successfully completed at least four courses in one of the social sciences.

Refer to the General Regulations section of the Calendar for details of the regulations governing qualifying year.

Master of Arts

Admission Requirements

The normal requirement for admission to the master's program is B.A.(Honours), with at least high honours standing, in one of the disciplines represented in the Institute. Prospective applicants without such qualifications may be considered for admission if they have both a strong academic record and relevant work experience. Such students normally are asked to complete a qualifying year of study with at least high honours standing before proceeding to the master's program.

Program Requirements

The Master of Arts in Political Economy is a 5.0 credit program, one of which may be at the 4000- (honours undergraduate) level. Each candidate, in consultation with the Institute, must select and follow one of two optional patterns:

- 3.0 credits, a thesis equivalent to 2.0 credits, and an oral examination of the thesis
- 4.0 credits, a research essay equivalent to 1.0 credit, and an oral examination of the research essay

Whichever pattern is selected, all students in the Institute are required to take PECO 5000 and PECO 5001, two 0.5 credit seminars offered by the Institute.

Academic Standing

All master's candidates must maintain B standing or better (GPA of 8.0). A candidate may, with the recommendation of the Institute and the approval of the Dean of the Faculty of Graduate Studies and Research, be allowed a grade of C+ in 0.5 credit.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

The Institute's courses will not normally be open to undergraduate students.

PECO 5000 [0.5 credit] (formerly 44.500)
Theories of Political Economy
A survey of the core concepts and ideas proposed by both the founders and modern practitioners of political economy. Particular attention will be paid to contemporary theorists as well as classical theorists such as Smith, Ricardo, Marx, Mill, Schumpeter, Keynes, Veblen, and Innis.

PECO 5001 [0.5 credit] (formerly 44.501)
The Methodology of Political Economy
An examination of the methods, procedures, and rules for developing theory and guiding inquiry in political economy research, including topics such as logic of inquiry, conceptualization, research design, dialectics, level of analysis, comparison, evidence and statistics.

PECO 5501 [0.5 credit] (formerly 44.551)
Selected Problems in Political Economy I
(Also listed as SOCI 5504 and PSCI 5501.)

PECO 5502 [0.5 credit] (formerly 44.552)
Selected Problems in Political Economy II
(Also listed as SOCI 5505 and PSCI 5502.)

PECO 5900 [0.5 credit] (formerly 44.590)
Tutorial in Political Economy
A course of directed readings on selected aspects of political economy, involving preparation of papers as the basis for discussion with the tutor. Offered when no regular course offering meets a candidate's specific needs. Prerequisite: Permission of the Director.

PECO 5908 [1.0 credit] (formerly 44.598)
Research Essay
Directly linked to the student's course work, the research essay must be interdisciplinary in approach.

PECO 5909 [2.0 credits] (formerly 44.599)
M.A. Thesis
The thesis is an alternative to the research essay. It must also be interdisciplinary in approach, and requires greater substance and originality than the Research Essay. Normally, a student's thesis committee will be composed of members from more than one discipline.

Selection of Courses

In addition to the graduate courses offered by, or associated with, the Institute, the courses listed below are of relevance to students of political economy and would, with the prior approval of the Institute, be used to design a coherent and internally complementary set of courses to fulfil degree requirements. The list is not exclusive and is subject to change. Moreover, students may select 1.0 credit in political economy that is offered at the 4000-level.

Note: Students should be aware that the number of spaces in graduate courses offered by other departments may be limited, and that registration may be conditional upon obtaining the prior approval of the department concerned. It is the student's responsibility to ensure that permission is obtained from the appropriate department prior to registering in any of the following courses.

The Institute expects to attract high quality graduate students who will be likely to continue to a second post-graduate degree. Given that a Ph.D. program in political economy does not exist, master's students will be directed to consult with the department where they might wish to pursue doctoral studies so that they may select courses that will prepare them for this next stage.

Business
BUSI 5300, BUSI 5301

Canadian Studies
CDNS 5101, CDNS 5102, CDNS 5201, CDNS 5202, CDNS 5501, CDNS 5601

Economics
ECON 5101, ECON 5201, ECON 5202, ECON 5403, ECON 5500, ECON 5504, ECON 5505, ECON 5507, ECON 5806, ECON 5807

Geography
GEOG 4207 Urban Development and Analysis

GEOG 4300 Comparative Environmental Movements

GEOG 4400 Environmental Geopolitics

GEOG 4401 Geographies of Globalization

GEOG 5005, GEOG 5200, GEOG 5400, GEOG 5401, GEOG 5404, GEOG 5500

History
HIST 4201 Science and Technology in the Canadian Experience

HIST 4202 The Maritimes in Transition, 1870s to 1920s

HIST 4301 Canada from Confederation to the Great War

HIST 4303 Selected Problems in Canadian Business History 1850-1980

HIST 4307 Canada from War to War

HIST 4309 Modern Canada since 1939

HIST 4509 Selected Problems in Nineteenth- and Twentieth-Century British Social History

HIST 4509 Selected Problems in the History of Women and the Family: from the Industrial Revolution

HIST 4701 Selected Problems in International Economic History

HIST 5205, HIST 5206, HIST 5300, HIST 5302, HIST 5304, HIST 5506, HIST 5508, HIST 5509, HIST 5602, HIST 5800

International Affairs
INAF 5007, INAF 5101, INAF 5300, INAF 5302, INAF 5303, INAF 5501, INAF 5502, INAF 5401, INAF 5601

Law
LAWS 4001 Law, Family and Gender

LAWS 4002 Feminist Theories of Law

LAWS 4003 Historical Perspectives on Law, Economy and Society

LAWS 5002, LAWS 5003, LAWS 5004, LAWS 5005, LAWS 5006, LAWS 5007, LAWS 5200, LAWS 5302

Political Science
PSCI 4000 Topics in Canadian Government and Politics

PSCI 4002 Policy Seminar

PSCI 4009 Quebec Politics

PSCI 4102 Politics of Western Liberal Democracies

PSCI 4103 The State in Advanced Capitalist Societies

PSCI 4104 Theory and Practice in Third World Development

PSCI 4105 Selected Problems in Third World Development

PSCI 4401 Business-Government Relations in Canada

PSCI 4500 Feminist Analysis in Comparative Perspective

PSCI 4505 Transitions to Democracy

PSCI 4603 Analysis of International Political Economy

PSCI 4604 Selected Problems in International Political Economy

PSCI 5003, PSCI 5008, PSCI 5101, PSCI 5105, PSCI 5107, PSCI 5202, PSCI 5501, PSCI 5502, PSCI 5504, PSCI 5507, PSCI 5509, PSCI 5607

Public Administration
PADM 5001, PADM 5002, PADM 5107, PADM 5401, PADM 5604, PADM 5607, PADM 5701, PADM 5703, PADM 5806, PADM 5808

Social Work
SOWK 4102 Aboriginal Peoples and Social Policy

SOWK 4103 Practice and Policy in Immigration

SOWK 5102, SOWK 5105, SOWK 5106, SOWK 5301, SOWK 5805

Sociology and Anthropology
SOCI 5000, SOCI 5002, SOCI 5007, SOCI 5109, SOCI 5202, SOCI 5204, SOCI 5205, SOCI 5209, SOCI 5300, SOCI 5301, SOCI 5302, SOCI 5308, SOCI 5400, SOCI 5404, SOCI 5405, SOCI 5408, SOCI 5409, SOCI 5500, SOCI 5504, SOCI 5607, SOCI 5608, SOCI 5804, SOCI 5806

Political Science

Loeb Building B640
Telephone: (613) 520-2777
Fax: (613) 520-4064
E-mail: political_science@carleton.ca
Web site: www.carleton.ca/polisci

The Department

Chair of the Department, Chris Brown

Associate Chair, S. Bennett

Departmental Supervisor of Graduate Studies,
W.R. Newell

Assistant Supervisor of Graduate Studies,
H. von Riekhoff

The Department offers programs leading to the
M.A. and Ph.D. degrees. Graduate study and
research may be undertaken in the fields of
political theory, Canadian government and
politics, comparative government and politics,
international relations, and public administration
and policy analysis. Within these fields, students
may select more specialized areas, such as
classical, medieval, and modern, or analytic
and empirical theory; comparative government
and politics of a particular area or group of
countries where the Department has developed
particular strength.

In the Department and the self-standing schools
and institutes, Carleton University houses one
of the three largest concentrations in Canada of
well-known political science professionals. In
this configuration, the Department is unique in
offering the full range of fields that make up
modern political science, and is thus well placed
to develop critical and analytical skills in its
degree candidates, as the range of
perspectives, priorities, and methodologies in
contemporary political theory and political
studies in general are brought into close relation
with one another.

The Department is committed to the view that
the goal of studying politics is to continue and
further the search for the meaning and the
morality of public life (community) by historical,
critical, empirical, and analytical means. A
community's politics and its public policy
describe the extent of political community that
is aspired to, and which can feasibly be
accomplished given the context of power
relations in the international and domestic
institutional and economic conjunctures. The
Department exists to continue the discussions
that run through the history of the study of
politics about what is good, and how to maintain
the autonomy of the sphere of the public and
the political in the face of multiple challenges,
which now include citizen apathy and economic
forces that escape states. Students emerge with
minds trained to identify, weigh, and sift ideals

and evidence, using the full range of
methodologies, and with grounding in the
politics of areas and institutional configurations.
They are also equipped for one of the most
important roles in human life: that of citizen.

Qualifying-Year Program

Applicants with a general (3-year) B.A. in Political
Science, with second-class standing, may be
considered for admission to a qualifying-year
program. Candidates who complete the
qualifying year with high honours standing may
be considered for admission to the master's
program the following year.

Refer to the General Regulations section of this
Calendar for details of the regulations governing
the qualifying year.

Master of Arts

Admission Requirements

The normal requirement for admission to the
master's program is B.A.(Honours) (or the
equivalent) in Political Science, with at least
high honours standing.

Honours graduates in fields other than political
science will be considered on the basis of their
academic background and standing, and will
be judged on a case-by-case basis. Those with
only minor deficiencies may be required to take
certain specified courses, while others whose
degrees are less closely related to political
science may be required to register in the
qualifying year, at the discretion of the
Department. Graduates of three-year programs
in political science will be required either to
complete the fourth year of an honours degree
and reapply, or register in the qualifying year of
the M.A. (see above), depending on work
completed to date and academic standing.

Program Requirements

All master's candidates will fulfil a 5.0 credit
program requiring departmental approval. No
more than 1.0 credit may be taken at the 4000-
level. It is anticipated that candidates will enter
with both political theory and research methods
in their backgrounds. In cases where this is not
so, candidates will, with the advice of the
Department, select suitable courses as part of
their programs.

All candidates, in consultation with the
Department, will pursue their degree either by
course work only or by undertaking an
independent research project. The independent
research project can be fulfilled in one of two
ways: a 1.0 credit research paper on a topic

related to at least one of the courses taken, that may represent a significant development of one or more papers submitted in fulfillment of course requirements; or a 2.0-credit thesis.

Details of defences for the above M.A. options are outlined in the section on defences.

Students who choose to specialize in Canadian government and politics must demonstrate a reading knowledge of French, except where a degree of proficiency in another language makes more sense in relation to the student's program of studies.

Students whose mother tongue is other than English and who do not intend to specialize in Canadian politics, or students whose research interests require another language or another research skill such as methods, may obtain permission from the Department to substitute another language or a research skill for French. Departmental language tests are administered twice a year.

The language requirement may also be satisfied by passing an approved language course with a grade of B- or better.

Course Requirements

All master's candidates are required to take an approved methods course. Students who have not already taken a course in research design and methods at the undergraduate level may be required, depending on the course pattern chosen, to take PSCI 5700. When appropriate and related significantly to the program of study, another methods course, such as PSCI 5304, PSCI 5701, PSCI 5702, or PSCI 5703, may be substituted.

Candidates will follow one of three program patterns:

- 5.0 credits in approved courses
- Research Essay (1.0 credit) and 4.0 credits in courses
- Thesis (2.0 credits) and 3.0 credits in courses

Study Themes

The Department offers a number of study themes that draw systematically from the department's range of courses and expertise. Students are encouraged, but not required, to pursue one of these study themes.

Seven study themes are currently available. These are:

- Public Affairs and Policy Analysis
- Political Theory: Modernity, Technology and the Common Good
- North American Government and Community Studies

- European Politics
- Development Politics
- Global Politics and Society
- Canadian Politics, Government and Institutions

Students pursuing a study theme are required to meet the general program requirements for the M.A. degree. That is, they must complete a 5.0 credit program, including an approved methods course if they have not already taken a course in research design and methodology at the undergraduate level. Students pursuing a study theme may choose either the research essay or thesis program pattern. The research essay or thesis they write must be on an approved topic appropriate to their study theme. As part of their program, students pursuing a study theme must take a minimum of 1.5 credits of designated thematic courses, as listed below. Students may substitute other courses for those listed only with the approval of the Supervisor of Graduate Studies.

Public Affairs and Policy Analysis

This theme of study focuses on theoretical and practical analysis of the policy process, including the design, management, communication, and analysis of all aspects of policy, with particular emphasis on quantitative analysis of public opinion, media impacts on policy, and policy outcomes.

The study theme will include:

- PSCI 6407, PSCI 6408, plus either PSCI 5902 or one of: PSCI 5006, PSCI 5109, PSCI 5406, PSCI 5509;
- Research Essay or thesis on a topic appropriate to the theme.

Political Theory: Modernity, Technology, and the Common Good

This theme explores ethical and analytical concepts for the evaluation of contemporary political practice, including legitimacy, civic virtue, and human rights. Its central topics include the critique of modernity; global technology; the communitarian-liberalism debate; alternative understandings of the common good; and the competing claims of charity and justice. Its approaches include hermeneutics, phenomenology, postmodernism, critical theory, democratic theory, and political culture and myth.

The study theme will include:

- PSCI 4305 or PSCI 6300 and PSCI 6301; plus one of PSCI 5301, PSCI 5302, PSCI 5304, PSCI 5308, PSCI 5309;
- Research Essay or thesis on a topic appropriate to the theme.

North American Government and Community Studies

This theme focuses on the politics of the North American region. Students can explore the forces linking Canada, the United States and Mexico from a variety of perspectives, including institutions, civil society and political economy, as well as the domestic and international politics of the three countries.

The study theme will include:

- PSCI 5100 or PSCI 5607; one of: PSCI 5000, PSCI 5003, PSCI 5006, PSCI 5007, PSCI 5008, PSCI 5009, PSCI 5101, PSCI 5401, and one of PSCI 5205, PSCI 5206, PSCI 5306, PSCI 5307;
- Research Essay or thesis on a topic appropriate to the theme.

European Politics

The theme focuses on the contemporary transitions of European politics, encompassing political integration through the European Union and the transition from communism in Eastern Europe, Central Europe, and Russia.

These changes have called into question conventional thinking about market reform, democratization, and the role of the state. Because these shifts and transformations have created an environment in which European political issues have become both more continental in scope and more comparable, students opting for this scheme can pursue a course of study encompassing both Western and Eastern Europe.

The study theme will include:

- At least 1.5 credits, including at least one of PSCI 5104, PSCI 5105, PSCI 5106; and at least one of: PSCI 5503, PSCI 5504, PSCI 5608, PSCI 5609;
- Research essay or thesis appropriate to the theme.

Development Politics

This theme features topical, critical, and analytical approaches to development. Students will explore the political economy of development and underdevelopment, democratization and the elaboration of "civil society", the politics of aid giving and receiving, and the role of non-governmental organizations.

The study theme will include:

- PSCI 5202; plus two of: PSCI 5107, PSCI 5108, PSCI 5203, PSCI 5405, PSCI 5808;
- Research Essay or thesis on a topic appropriate to the theme.

Global Politics and Society

This theme focuses on the politics of global society. Students will explore the ways in which the process of globalization, conceived as the compression of the world and the intensification of consciousness of the world as a whole, accelerated by the political and economic collapse of the communist bloc and the integration of its successor states into the world economy, has altered the international economic and political orders.

The study theme will include:

- PSCI 5509 and 5808; plus one of: PSCI 5801, PSCI 5804, PSCI 5805, PSCI 5807;
- Research Essay or thesis on a topic appropriate to the theme.

Canadian Politics, Government and Institutions

This theme takes up recent debates in Canada about the relationship between civil society and government, political culture and political economy, political parties and state institutions. The effectiveness of various kinds of regimes and institutional and state structures, the role that such structures play in promoting or resisting change, and the changes in the reach and autonomy of politics and the state itself can be explored within this theme.

The study theme will include:

- At least 3.0 credits of: PSCI 5000, PSCI 5003, PSCI 5006, PSCI 5007, PSCI 5008, PSCI 5009, PSCI 5101, PSCI 5401, PSCI 5507, PSCI 5601, PSCI 6000, PSCI 6001;
- Research essay or thesis appropriate to the theme.

Defences

In the case of the student choosing a research essay, that essay will be evaluated by two of the Department's faculty members including the supervisor and a second reader, and a letter grade will be assigned. An oral defence of the essay is not required but may be requested by the supervisor or second reader.

In the case of the student choosing a thesis, the thesis will be evaluated by three people: the student's thesis supervisor from the Department, a second reader from the Department, and an external third reader who is generally from another Carleton Department but may sometimes come from outside the University. A thesis must be defended orally before the three evaluators. No letter grade is assigned, but notations of Pass with Distinction, Satisfactory, and Unsatisfactory are assigned.

Academic Standing

All master's candidates must obtain a B standing or better (GPA 8.0). One grade of C+ may be allowed.

Internship Program

Internship placements may be available to persons eligible to work in Canada who are full-time students and are registered in the Internship Program option of the master's program. The Internship Program is an option within the five-course, research essay, or thesis M.A. program patterns. Placements locate students for one term in government departments or non-governmental organizations and integrate the theoretical and practical aspects of Graduate Studies in Political Science. A placement is combined with registration in PSCI 5902, Internship Placement. This course is required for students who graduate from this option.

Doctor of Philosophy

The Ph.D. program in political science normally will be undertaken on a full-time basis. However, in cases of exceptional merit, the Department will accept a few candidates for the degree on a part-time basis.

Admission Requirements

The normal requirement for admission to the Ph.D. program is a master's degree (or its equivalent) in political science with high honours standing or better. Applicants should note, however, that meeting the admission requirement does not guarantee admission to the program. Review of the department's competitive selection process indicates that students with a GPA below 10.0 (A-) in the master's program are generally not recommended for admission to the doctoral program. Students applying on the basis of a master's degree from other disciplines will be considered on a case-by-case basis, and may be required to take additional courses as part of the program.

Program Requirements

The normal program requirements for Ph.D. candidates are outlined in the General Regulations section of this Calendar.

It is anticipated that Ph.D. candidates will enter with a background in political theory at the undergraduate level, regardless of their desired field of specialization. Those who do not will be treated as special cases and will have their programs arranged accordingly. If statistical proficiency is needed for the preparation of the thesis, students will also be expected to take a course in research methods. Candidates are also expected to demonstrate proficiency in a second language or in research methods. All candidates will complete PSCI 6906.

The program requirements (10.0 credits unless additional course work is required) for Ph.D. candidates in Political Science are the following:

- At least 1.0 credit at the graduate level in each of the candidate's two major fields of study; a GPA of 9.0 or better must be obtained in these courses for students to be allowed to proceed to the comprehensive examinations.

- Satisfactory completion of PSCI 6900 (1.0 credit), preparation for a written comprehensive examination covering the two major fields. The grade to be awarded will be that obtained on the field examinations, normally written in two parts with one week between the parts, on two occasions each year, April and August.

- Proficiency in a research skill, as outlined under research skill requirement

- At least 1.0 credit will normally be taken during the second year of the program in fields allied to the major topics of the thesis. This credit will normally be fulfilled through regular course work rather than tutorials.

- Successful completion of PSCI 6906 (1.0 credit)

- A public defence, in English, of a written thesis proposal

- A 5.0 credit thesis, written in English or French, which will be defended in English at an oral examination.

Full-time students are required to complete the comprehensive examinations within 12 months of entering the program, and must normally complete the public defence of the thesis proposal, preceded by its formal acceptance by the supervisory committee, within 24 months of entering the doctoral program.

Ph.D. candidates will each be assigned a faculty member to advise them on their studies. Students' programs, including the choice of supervisor and the thesis committee, must be approved by the Department. The thesis supervisor will normally be chosen from among faculty members in the Department of Political Science. Upon approval of the thesis supervisor and the Department, committee members may be chosen from elsewhere within the University.

Research Skill Requirement

Ph.D. candidates must demonstrate the ability to use a research skill appropriate to their program. The research skill requirement will normally be satisfied before the defence of the thesis proposal, and will take one of the following forms:

- An ability to read and translate French or another language appropriate to their course of study; or the ability to speak a language other than English sufficient to conduct interviews in that language

- Credit work in an approved political science methods course, workshop, or colloquium, equivalent to 1.0 credit; or any two of the following courses (or an approved alternative): PSCI 5700, PSCI 5701, PSCI 5702, and PSCI 5703.

Comprehensive Examinations

All Ph.D. candidates must successfully complete a written comprehensive examination covering their two major fields. The examination is in the form of two examination papers normally written one week apart. At the discretion of the Department, candidates may be required to take an oral examination following the written examination.

The fields of study for the Ph.D. comprehensive examination are to be chosen from the following list:

Political Theory
A general knowledge of the main outlines and significant themes and problems of political philosophy and thought.

Canadian Government and Politics
A general knowledge of Canadian political ideas, institutions, and processes.

Comparative Government and Politics
A general knowledge of the theories and methodology of comparative politics.

International Relations
A general knowledge of international relations theory and the development of the field, including international organization, global political economy, conflict resolution, strategic studies, foreign policy analysis, international development, and gender and international relations.

Public Affairs and Policy Analysis
A general knowledge of theories of bureaucracy, organization, and public administration; and theory, practice, and methods of analysis in public affairs and public policy within and outside Canada.

Thesis Proposal
All students must publicly defend a thesis proposal after completing their comprehensive examinations. Full-time students must complete this requirement within the first two years of registration in the program. Details on this program requirement are provided in Departmental Guidelines for the Graduate Program.

Selection of Courses

Within the scope of the regulations, the following undergraduate courses (fully described in the Undergraduate Calendar) may be taken by graduate students.

Please note that not all of these courses are offered every year. Students should consult the timetable published each year in early June.

Political Science
PSCI 4000   Topics in Canadian Government and Politics

PSCI 4002   Policy Seminar: Problems of Northern Development

PSCI 4003   Politics and the Media

PSCI 4005   Stability, Justice and Federalism

PSCI 4007   The Politics of Law Enforcement in Canada

PSCI 4008   National Security and Intelligence in the Modern State

PSCI 4009   Quebec Politics

PSCI 4100   Canadian and Comparative Local Government and Politics

PSCI 4101   French-English Relations

PSCI 4102   Politics of Western Liberal Democracies

PSCI 4103   The Modern State

PSCI 4104   Theory and Practice in Third World Development

PSCI 4105   Selected Problems in Third World Development

PSCI 4106   Labour and the Canadian State

PSCI 4107   Political Participation in Canada

PSCI 4108   Canadian Provincial Government and Politics

PSCI 4109   The Politics of the Canadian Charter of Rights and Freedoms

PSCI 4200   Policy Making in the United States

PSCI 4201   Politics of Influence in the United States

PSCI 4202   Comparative Constitutional Politics

PSCI 4205   Identity Politics

PSCI 4304   Political Inquiry

PSCI 4305   Contemporary Political Theory

PSCI 4401   Business-Government Relations in Canada

PSCI 4409   Issues in Development Management

PSCI 4500 - Feminist Political Analysis in Comparative Perspective

PSCI 4505   Transitions to Democracy

PSCI 4600   Analysis of International Politics

PSCI 4601   Foreign Policies of Soviet Successor States

PSCI 4602   Bargaining and Negotiation

PSCI 4603   Analysis of International Political Economy

PSCI 4604   Selected Problems in International Political Economy

PSCI 4605   Gender in International Relations

PSCI 4606   American Foreign Policy

PSCI 4802   International Politics of Africa

PSCI 4803   Foreign Policies of Major East Asian Powers

Students are encouraged to look for courses within Carleton in the Departments of Economics, Geography, History, Law, Philosophy, and Sociology and Anthropology; the Schools of Business, Journalism and Communication, Public Administration, and the Norman Paterson School of International Affairs; and in the Institutes of European and Russian Studies, and Political Economy. They are equally strongly encouraged to look for courses in the Departments of Political Science and Philosophy at the University of Ottawa.

All courses selected will be subject to the approval of the Department, on grounds of appropriateness to the program of study and the avoidance of excessive overlap between courses.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Enrolment in graduate courses requires the permission of the Department, through the supervisor of graduate studies.

PSCI 5000 [0.5 credit] (formerly 47.500)
Topics in Canadian Government and Politics
Depending on student demand and faculty interest, a seminar will be offered on the political challenges faced by citizens, politicians and governments in Canada.

PSCI 5002 [0.5 credit] (formerly 47.502)
Political Law: Principles
An examination of the legal framework of the state, and the various types of instruments of government. It treats the way law makes its impact upon decision-making, with a particular focus on the influence of law on policy, administrative action, and political life.

PSCI 5003 [0.5 credit] (formerly 47.503)
Political Parties in Canada
A seminar on political parties and party systems in Canadian federal politics, including an examination of patterns of historical development, party organization and finance, relationships with social movements, and the impact of Canadian federalism.

PSCI 5006 [0.5 credit] (formerly 47.506)
Legislative Process in Canada
The role of Parliament and of the individual M.P. in terms of policy making, representation and the passage of legislation. Also offered at the undergraduate level, with different requirements, as PSCI 4006, for which additional credit is precluded.

PSCI 5007 [0.5 credit] (formerly 47.507)
Topics in Canadian Politics and Government in Comparative Perspective
Depending on student demand and faculty interest, a seminar will be offered on topics in Canadian politics and government within a comparative perspective, the various countries being considered chosen on the basis of the issue at hand.

PSCI 5008 [0.5 credit] (formerly 47.508)
The Politics of Energy and the Environment
A research seminar focusing upon the substantive issues, the policy structures and processes, and current Canadian governmental response in the area of energy policy and environmental quality management.

PSCI 5009 [0.5 credit] (formerly 47.509)
Canadian Political Economy
A seminar on political economy as a traditional and contemporary approach to the study of Canadian politics and the Canadian state. Canada's economic development, social relations (including gender and race relations), and position in the international political economy is explored.

PSCI 5100 [0.5 credit] (formerly 47.510)
Indigenous Politics of North America
Examines issues of governance regarding the original peoples of Canada, Mexico and the United States before and since the European

invasion, including: movement for restoration of cultural, socio-economic, political, land and self-government rights. Also offered at the undergraduate level, with different requirements, as PSCI 4206, for which additional credit is precluded.

PSCI 5101 [0.5 credit] (formerly 47.511)
Canadian Federalism
A study of the evolution and contemporary operation of the Canadian federal system, noting particularly the specific social, political, economic, and structural features which underlie its operational performance, its resilience in crisis, and its potential for adaptation.

PSCI 5104 [0.5 credit] (formerly 47.514)
The Transition from Communism
An in-depth investigation of the problems of transition in post-communist societies.

PSCI 5105 [0.5 credit] (formerly 47.515)
Post-Communist Politics in East Central Europe
A comparative examination of the emergence of post-communist political systems in East Central Europe.

PSCI 5106 [0.5 credit] (formerly 47.516)
Selected Problems in the Politics of Soviet Successor States
A seminar on selected problems of nation-building in Russia, Ukraine, and other Soviet successor states.

PSCI 5107 [0.5 credit] (formerly 47.517)
Globalization, Adjustment and Democracy in Africa
This course will explore the nature of global pressures in Africa as states go through a "second wind" of political and economic change. Also offered at the undergraduate level, with different requirements, as PSCI 4207, for which additional credit is precluded.

PSCI 5108 [0.5 credit] (formerly 47.518)
State, Revolution and Reform
The dynamics of political change and economic growth in non-Western states, emphasizing challenges to dominant patterns of policy-making with a view of exploring alternate modes of modernity.

PSCI 5109 [0.5 credit] (formerly 47.519)
Comparative Public Policy
A review of approaches to the study of policy, of the impact of political factors on policy, and of the substance of policy choices in such domestic fields as communications, social security, health, industrial and rural development policies in selected countries.

PSCI 5200 [0.5 credit] (formerly 47.520)
Nationalism
A seminar on the historical and comparative study of nationalism, with emphasis on its role in the promotion of political change.

PSCI 5201 [0.5 credit] (formerly 47.521)
Politics in Plural Societies
A seminar on politics in multicultural societies and multi-national states, including settler and post-colonial societies. Topics may include: conflict relating to race, religion, language, regionalism, intra-state nationalism, multicultural policies and theories of pluralism.

PSCI 5202 [0.5 credit] (formerly 47.522)
Politics of Third World Development
A seminar examining the politics of development and underdevelopment in the Third World. Topics covered include theory, selected issues, and case studies from Africa, Asia, and Latin America.

PSCI 5203 [0.5 credit] (formerly 47.523)
Southern Africa in the Post-Apartheid Era
This course will explore the pathology of apartheid, the reasons for its end, and prospects for democratization and development in southern Africa in the era of globalization. Also offered at the undergraduate level, with different requirements, as PSCI 4203, for which additional credit is precluded.

PSCI 5204 [0.5 credit] (formerly 47.524)
Elections
The conduct and meaning of elections in contemporary states. Attention to the connection of elections to concepts of representation, policy mandates, and political parties, and to electoral systems and referenda. Also offered at the undergraduate level, with different requirements, as PSCI 4204, for which additional credit is precluded.

PSCI 5205 [0.5 credit] (formerly 47.525)
Problems in American Government I
A research seminar on topics such as the distribution of power, decision-making processes, the impact of technology, strains in intergovernmental relations, civil-military relations, governmental news management and secrecy; executive accountability, and impediments to reform of Congress and the presidency.

PSCI 5206 [0.5 credit] (formerly 47.526)
Problems in American Government II
A research seminar on topics such as political violence and social change, the roles of mass media, business élite roles, political corruption, civil rights and minority politics, and the urban crisis.

PSCI 5301 [0.5 credit] (formerly 47.531)
Modern Political Culture and Ideology
This seminar explores certain connections among image, symbol, myth, language, and politics. Topics include the expressive and designative conceptions of language; myth, metaphor and the foundations of civic life; rhetoric and the sensus communis; romanticism and nationalism; myth in democratic and totalitarian politics; and the structure of political culture.

PSCI 5302 [0.5 credit] (formerly 47.532)
Democratic Theories
Analysis of various theories of democracy and community, from classical to modern.

PSCI 5303 [0.5 credit] (formerly 47.533)
Governmentality·and Politics
Utilizing the work of Foucault and others on 'governmentality', this course will analyze national and international government not only as a set of institutions or processes, but also in terms of specific arts and strategies. Topics may include federalism, colonialism, liberalism, but also arts of resistance. Also offered at the undergraduate level, with different requirements, as PSCI 4303, for which additional credit is precluded.

PSCI 5304 [0.5 credit] (formerly 47.534)
Political Inquiry
This seminar focuses on the major approaches to research in political areas as discussed in contemporary philosophy of the social sciences, exploring the variety of explanatory strategies in use in the contemporary study of politics. Precludes additional credit for PSCI 5700.

PSCI 5306 [0.5 credit] (formerly 47.536)
North American Political Traditions
A seminar on the interpretations that may include American, Mexican, anglo-Canadian and franco-Canadian political traditions. Precludes additional credit for PSCI 5305.

PSCI 5307 [0.5 credit] (formerly 47.537)
Political Thought in North America
Depending on student demand and faculty interest, a tutorial will be offered in topics related to the development of contemporary political thinking, including some more descriptive and contemporary topics such as the impact of religion and religiosity in political thought and culture.
Precludes additional credit for PSCI 5305.

PSCI 5308 [0.5 credit] (formerly 47.538)
Concepts of Political Community I
A critical survey of concepts of political community, including the common good, justice, citizenship, statesmanship, democracy, and legitimacy, from ancient, modern, and contemporary political theory.
Precludes additional credit for PSCI 4306.

PSCI 5309 [0.5 credit] (formerly 47.539)
Concepts of Political Community II
A continued critical survey of concepts of political community, including the common good, justice, citizenship, statesmanship, democracy, and legitimacy, from ancient, modern, and contemporary political theory.
Precludes additional credit for PSCI 4307.
Prerequisite: PSCI 5308 or permission of the Department.

PSCI 5401 [0.5 credit] (formerly 47.541)
Canadian Public Administration and Policy Analysis
The theory and practice of public administration in Canada, with emphasis on the federal level, including the role of the bureaucracy in policy making.

PSCI 5404 [0.5 credit] (formerly 47.544)
Public Administration in Developed Western Countries
A seminar in comparative public administration, with emphasis on Commonwealth countries, the United States, France, and West Germany.

PSCI 5405 [0.5 credit] (formerly 47.545)
Public Administration in Developing Countries
A seminar on the literature and characteristics of development administration; comparison by region, country, and topic.

PSCI 5406 [0.5 credit] (formerly 47.546)
Topics in Public Affairs
A seminar on selected topics in the role and impact of media, issues in public affairs and public policy.

PSCI 5409 [0.5 credit] (formerly 47.549)
Research Seminar in Public Administration
The content of this seminar will vary from year to year according to faculty research interests and student demand.

PSCI 5501 [0.5 credit] (formerly 47.551)
Selected Issues in Political Economy I
A research seminar exploring a selected topic of current research having a political economy perspective, such as power and stratification; dynamics of state action; contrasting views on administration as an instrument of political economy; culture, ideology, and social relations; and the labour process. (Also listed as PECO 5501 and SOCI 5404.)

PSCI 5502 [0.5 credit] (formerly 47.552)
Selected Issues in Political Economy II
A research seminar exploring a selected topic of current research having a political economy perspective, such as power and stratification; dynamics of state action; contrasting views on administration as an instrument of political economy; culture, ideology, and social relations; and the labour process. (Also listed as PECO 5502 and SOCI 5505.)

PSCI 5503 [0.5 credit] (formerly 47.553)
Topics in West European Politics
This course is designed to deal intensively with domestic politics in Britain, France, Germany, Italy, and selected minor European powers. Precludes additional credit for PSCI 5500.

PSCI 5504 [0.5 credit] (formerly 47.554)
Topics in West European Politics
This course is designed to deal intensively with comparative and supra-national issues concerning the European Community, NATO,

and other Western European institutions. Precludes additional credit for PSCI 5500.

PSCI 5505 [0.5 credit] (formerly 47.555)
Topics in Comparative Politics I
A research seminar dealing with a central theme of current research in comparative politics, such as: the effects of state policy and expenditure; technology and politics; political psychology; sex/gender and politics; the military and politics; Marxism and politics; religion and politics; studies in revolution; comparative parties and interest groups.

PSCI 5506 [0.5 credit] (formerly 47.556)
Sex/Gender and Politics
Examines selected sex/gender dimensions of politics in comparative perspective. Topics may include: gendered nature of authority, sex/gender regimes and state forms; feminist accounts of citizenship, representation, power and democracy; women's movements and anti-feminist movements; identity politics; gendered accounts of nationalism and multiculturalism.

PSCI 5507 [0.5 credit] (formerly 47.557)
Social Movements and Civil Society in Comparative Perspective I
This course examines major theoretical approaches to social movements with a focus on the civil societies of industrialized countries in a globalizing context. Specific movements to be examined may include the women's movement, the environmental movement, and the anti-globalization movement.

PSCI 5508 [0.5 credit]
Social Movements and Civil Society in Comparative Perspective II
This course examines major theoretical approaches to social movements with a focus on the civil societies of developing countries in a globalizing context. Specific movements to be examined may include the women's movement, the environmental movement, and the anti-globalization movement.

PSCI 5509 [0.5 credit] (formerly 47.559)
Governing in the Global Economy
The course examines how national states respond to challenges of governing in an increasingly interdependent global economy. The course will be comparative in its focus, emphasizing advanced industrial societies primarily in western Europe and Canada.

PSCI 5601 [0.5 credit] (formerly 47.561)
Analysis of Canadian Foreign Policy
A research seminar on contemporary Canadian external policies, with emphasis on the analysis of cases and issues, and comparisons with other national actors.

PSCI 5607 [0.5 credit] (formerly 47.567)
International Politics of North America
An examination of continentalism in Canadian foreign policy during the twentieth century that charts regional, economic, political, and defence

relations in North America. Also offered at the undergraduate level, with different requirements, as Political Science PSCI 4607, for which additional credit is precluded.

PSCI 5608 [0.5 credit]
European Integration and European Security
A seminar focusing on issues related to the formation of supra-national decision-making structures in Europe. Also offered at the undergraduate level, with different requirements, as Political Science PSCI 4608, for which additional credit is precluded. (Also listed as EURR 4104/5104).

PSCI 5609 [0.5 credit]
Selected topics in European Integration Studies
A seminar focusing on selected topics related to European integration in the post-World War II period. (Also listed as EURR 5106).

PSCI 5700 [0.5 credit] (formerly 47.570)
Basic Research Methods
A course in applied research design and methodology, with emphasis on empirical research strategies that are amenable to quantification. Master's students who have not completed Political Science PSCI 2700 (or its equivalent) with high honours or better standing may be required to take this course.

PSCI 5701 [0.5 credit] (formerly 47.571)
Intermediate Polimetrics for Micro Data
This course covers intermediate research designs and statistical techniques primarily used in analyzing survey data. Selected topics may vary from year to year. Students intending to do research based on micro data are advised to take this course. Also offered at the undergraduate level, with different requirements, as Political Science PSCI 4701, for which additional credit is precluded.
Prerequisite: Political Science PSCI 5700 or permission of the Department.

PSCI 5702 [0.5 credit] (formerly 47.572)
Intermediate Polimetrics for Macro Data
This course covers intermediate research designs and statistical techniques primarily used in analyzing macro or aggregate data. Selected topics may vary from year to year. Students intending to do research based on macro data are advised to take this course. Also offered at the undergraduate level, with different requirements, as Political Science PSCI 4702, for which additional credit is precluded.
Prerequisite: Political Science PSCI 5700 or permission of the Department.

PSCI 5703 [0.5 credit] (formerly 47.573)
Advanced Research Methods
A course in advanced techniques of analysis. The focus of this research seminar is the use of various mathematical and statistical techniques in the construction and analysis of political theory. The seminar may include such topics as the translation of verbal theory into formal theory,

the use of statistical techniques beyond regression and correlational analysis to examine political hypotheses, and index construction, including scaling and validation techniques.
Prerequisite: PSCI 5700 or permission of the Department.

PSCI 5801 [0.5 credit] (formerly 47.581)
Foreign Policies of African States
The foreign policy determinants and international behaviour of African states. Each year, the seminar focuses on a particular issue area.
Precludes additional credit for PSCI 5802.
Prerequisite: Permission of the Department.

PSCI 5804 [0.5 credit] (formerly 47.584)
International Relations of South and South-East Asia
Foreign policy orientations of the regional actors and interaction with non-regional actors. Special emphasis on enduring sources of conflict within the area, and emerging patterns of co-operation, including comparison of ASEAN with SAARC. Also offered at the undergraduate level, with different requirements, as PSCI 4804, for which additional credit is precluded.

PSCI 5805 [0.5 credit] (formerly 47.585)
Foreign Policy Analysis
A research seminar dealing with selected problems in the study of foreign policy formulations and outcomes.

PSCI 5806 [0.5 credit] (formerly 47.586)
Strategic Thought and Issues in International Security
A research seminar on the evolution of classical and contemporary strategic thought, as well as on current issues in international security.

PSCI 5807 [0.5 credit] (formerly 47.587)
Analysis of International Organizations
A research seminar on process and change in contemporary forms of international organization.

PSCI 5808 [0.5 credit] (formerly 47.588)
International Political Economy
A seminar on the changing international division of labour, and its consequences for world politics. Topics include differing patterns of industrialization, colonial relations, the role of the state, and current issues in international political economy. (Also listed as INAF 5808.)
Prerequisite: Work at a senior undergraduate level in at least two of the following: international relations, development studies, international trade, or political economy ; or permission of the Department.

PSCI 5809 [0.5 credit] (formerly 47.589)
Problems in International Politics
A workshop on significant issues in the study of international politics, with emphasis on the state of the field (and subfields) and problems in research.
Prerequisite: PSCI 5600, or PSCI 6600 and PSCI 6601, or permission of the Department.

PSCI 5900 [1.0 credit] (formerly 47.590)
Tutorial in a Selected Field
Tutorials or reading courses on selected topics may be arranged with the permission of the Department.

PSCI 5901 [0.5 credit] (formerly 47.591)
Tutorial in a Selected Field
Tutorials or reading courses on selected topics may be arranged with the permission of the Department.

PSCI 5902 [0.5 credit] (formerly 47.592)
Internship Placement
Internship placements are approved by the Supervisor of Graduate Studies. Academic requirements are met through an essay and oral examination.
Prerequisite: Selection to Internship Program.

PSCI 5908 [1.0 credit] (formerly 47.598)
M.A. Research Essay
Tutorial for students who write a research essay rather than a thesis.

PSCI 5909 [2.0 credits] (formerly 47.599)
M.A. Thesis

Please note that courses numbered PSCI 6000 through PSCI 6601 are open to both M.A. and Ph.D. students.

PSCI 6000 [0.5 credit] (formerly 47.600)
The Political Process in Canada I
An analytical study of the democratic political process, with particular reference to political parties and elections, pressure groups, and political leadership in Canada.
Precludes additional credit for PSCI 5100.

PSCI 6001 [0.5 credit] (formerly 47.601)
The Political Process in Canada II
An analytical study of the democratic political process, with particular reference to political parties and elections, pressure groups, and political leadership in Canada.
Precludes additional credit for PSCI 5100.

PSCI 6105 [0.5 credit] (formerly 47.615)
Comparative Politics I
A research seminar dealing with theories, methods, and problems of comparison.
Precludes additional credit for PSCI 5005.

PSCI 6106 [0.5 credit] (formerly 47.616)
Comparative Politics II
A research seminar dealing with particular themes.
Precludes additional credit for PSCI 5005.

PSCI 6300 [0.5 credit] (formerly 47.630)
Political Theory I
An intensive examination of the major questions in classical, medieval, modern, and contemporary political philosophy. This political theory course is both historically comprehensive in scope and thematically oriented in depth.
Precludes additional credit for PSCI 5300.

PSCI 6301 [0.5 credit] (formerly 47.631)
Political Theory II
An intensive examination of the major questions in classical, medieval, modern, and contemporary political philosophy. This political theory course is both historically comprehensive in scope and thematically oriented in depth. Precludes additional credit for PSCI 5300.

PSCI 6407 [0.5 credit] (formerly 47.647)
Public Policy: Content and Creation
This course provides an opportunity to examine and apply major perspectives on the content and creation of public policy. The focus is on the explanation, prediction and design of policy. Perspectives and examples are drawn from a variety of frameworks and from both Canadian and non-Canadian contexts. Also offered at the undergraduate level, with different requirements, as PSCI 4407, for which additional credit is precluded.

PSCI 6408 [0.5 credit] (formerly 47.648)
Public Affairs Management and Analysis
A seminar on theories and practice in the management of public affairs, including the environment and administration of the public sector, public opinion, and public communications. Also offered at the undergraduate level, with different requirements, as PSCI 4406, for which additional credit is precluded.

PSCI 6600 [0.5 credit] (formerly 47.660)
Theory and Research in International Politics I
An examination of the principal problems in contemporary international relations theory and research, emphasizing the state of the field and current directions in it.
Precludes additional credit for PSCI 5600.

PSCI 6601 [0.5 credit] (formerly 47.661)
Theory and Research in International Politics II
An examination of the principal problems in contemporary international relations theory and research, emphasizing the state of the field and current directions in it.
Precludes additional credit for PSCI 5600.

PSCI 6900 [1.0 credit] (formerly 47.690)
Ph.D. Tutorials
Ph.D. tutorials specifically designed as intensive preparation for the major field examinations, under the direction of one or more members of the Department. The grade to be awarded will be that obtained on the field examination.

PSCI 6901 [1.0 credit] (formerly 47.691)
Ph.D. Tutorials
Ph.D. tutorials specifically designed as intensive preparation for the minor field examinations, under the direction of one or more members of the Department. The grade to be awarded will be that obtained on the field examinations.

PSCI 6902 [1.0 credit] (formerly 47.692)
Ph.D. Tutorials
Ph.D. tutorials specifically designed as intensive preparation for the minor field examinations, under the direction of one or more members of the Department. The grade to be awarded will be that obtained on the field examinations.

PSCI 6905 [1.0 credit] (formerly 47.695)
Ph.D. Tutorials
Ph.D. tutorials specifically designed as intensive preparation for the major field examinations, under the direction of one or more members of the Department. The grade to be awarded will be that obtained on the field examination.

PSCI 6906 [1.0 credit] (formerly 47.696)
Thesis Proposal Workshop
Following a survey of general issues and problems in developing research proposals, students will prepare their own thesis proposal. Coordinated by one instructor, but faculty from other fields will also participate. The grade for this course will be Satisfactory or Unsatisfactory. Prerequisite: Successful completion of comprehensive examinations or permission of the Department.

PSCI 6909 [5.0 credits] (formerly 47.699)
Ph.D. Thesis

Psychology

Loeb Building B555
Telephone: (613) 520-4017
Fax: (613) 520-3667
Web site: www.carleton.ca/psychology

The Department

Chair of the Department, Kim Matheson

Departmental Supervisor of Graduate Studies, Lise Paquet

The Department of Psychology offers programs of study and research on a full-time and part-time basis, leading to the degrees of M.A., M.Sc. and Ph.D. Financial support is available, but is limited to full-time students.

There is a very close link in the Department of Psychology between graduate studies and research. Research in the Department is distributed across the life sciences areas of behavioural neuroscience, animal learning, perception, and cognition, and across the social sciences areas of social and developmental psychology. Its research and graduate program in behavioural neuroscience is one of the strongest in Canada, with current research focusing on problems of the neurochemistry of stress and learning; developmental psychopharmacology; experimental models of epilepsy; neurodegeneration; dementia; neural mechanisms of audition; drug dependence; and the effects in animals and humans of prenatal alcohol and drug exposure on postnatal behaviour. The Department has related human neuropsychological research activities dealing with alterations to visual and auditory psychophysical functions associated with neuropathological conditions. In recent years, there has been a growth of activity in aspects of applied psychology, including evaluation research; corrections; education; impact of computer and telecommunications technology; behavioural medicine; and psychological assessment. This has fostered close collaborative contacts between the Department and public service and applied settings in Ottawa, such as the Children's Hospital of Eastern Ontario, the Royal Ottawa Hospital, the National Research Council, Department of Communications (Canada), Ontario Ministry of Correctional Services, and the Ottawa-Carleton Board of Education. Practica and internships are available in many of these settings to students at the doctoral level.

Because of the breadth of interests in the Department, there is an emphasis in graduate courses on methodological and conceptual issues that are applicable across research specializations. Consequently, most substantive courses, regardless of title, are relevant to most students' programs. Students typically work

very closely with their advisers who, through informal tutorials and directed studies and independent research courses, provide much of the opportunity for specialized study. Applicants are strongly encouraged to write directly to faculty members for more specific details on research interests and programs currently underway.

As part of its general experimental program, the Department provides the opportunity to pursue a concentration at the master's and doctoral level in behavioural neuroscience (a collaborative specialization with the University of Ottawa), human neuropsychology, or human information systems. Applicants should consult with the supervisor of graduate studies for information on structuring a doctoral program of studies within a concentration.

Through a quantitative methods requirement, completion of a demanding empirical thesis presented and defended orally, participation in small seminars, and a close relationship with faculty advisers and students, the master's programs provide the opportunity for a refinement of critical, logical, and analytical skills; skills of written and oral expression; understanding of the strengths and limitations of the scientific method as a means of problem solving, demonstrated through psychology but applicable to issues in society at large; an understanding of quantification and scaling; the use of statistical methods and inference; and the use of evidence to support argument. For some students this is a satisfactory and satisfying end in itself. For others, it provides a solid preparation for the doctoral program in which original independent study and research is stressed. The Department does not distinguish between an applied and an experimental program; instead, the basic orientation is experimental and theoretical, but with opportunities, where appropriate, to provide complementary experience necessary to work successfully as a psychologist in applied research/service settings.

Augmenting the well-equipped laboratories expected in an active research environment, the Department of Psychology receives excellent technical support from the Carleton University Science Technology Centre, where design and manufacture of special-purpose apparatus is carried out. In addition, the workshops provide technical support for the more than twenty-five computer systems in use throughout the Department's laboratories.

In fulfilling degree credit requirements, all graduate students are required to demonstrate competence in statistical and quantitative methods through successful completion of PSYC 5400 (with a grade of B- or better) or a qualifying

examination. The qualifying examination is ordinarily scheduled during the first part of September, just prior to the registration period, and it encompasses the material covered in PSYC 5400. In the event of successful completion of the examination, another course is substituted for PSYC 5400. In the case of M.A. students, the Department may recommend that a grade of C+ in PSYC 5400 be accepted for credit (General Regulations, Section 11.2) only after successful completion of the qualifying examination. This option is limited to those who pass the examination within two successive offerings of it, and who maintain continuous registration as graduate students between the first registration in PSYC 5400 and the taking of the examination.

In addition to fulfilling the remaining credit requirements as described in subsequent sections, all graduate students in psychology are expected to conduct research of interest to them during each year of graduate study. This requirement may be satisfied by independent research, serving as a research assistant, or by doing pilot is thesis research.

Each year, the candidate's adviser submits a written critique of research progress, and this becomes part of the candidate's permanent record. Qualifying-year students are evaluated at the end of the first twelve months.

Depending on his/her field of concentration, a candidate may be required to demonstrate an ability to read with understanding relevant technical material in a foreign language and/or to give satisfactory evidence of competence in such areas as computer techniques, electronic instrumentation, psychometrics, sampling procedures, or surgical techniques.

The Department may recommend that a graduate student be asked to withdraw from the program at any time if his or her progress in course work, research, or comprehensive examinations proves unsatisfactory.

Within the Department exist subgroups of faculty members with common interests and subgroups of courses associated with particular areas of psychology. Below are listed four formally identified fields of concentration, with the work that would be expected from any student who decided to pursue interests in one of these fields.

Concentrations

Basic and Applied Social Psychology

The Concentration in Basic and Applied Social Psychology is designed to provide students with a fundamental knowledge in the traditional fields of social psychology such as: social psychological research methods; attitudes and personality; the application of social psychology to current social issues such as family violence; health promotion,

assessment and program evaluation; crime and delinquency; computers and the psychology of women. Faculty interests span a broad spectrum of perspectives in social, personality, community and applied social psychology. Current research in the Department includes historical and critical social psychology, laboratory investigations of social processes in decision making and attitudes through applied studies in areas such as family violence, women and the work force, the psychology of women, delinquency, criminal justice and corrections, health promotion, and performance enhancement.

Students interested in this area are encouraged to take courses such as PSYC 5100, PSYC 5101, PSYC 5109 and PSYC 5406, as well as generate theses in this area.

Concentration in Cognitive Psychology

The Concentration in Cognitive Psychology is intended to provide the graduate student with an advanced knowledge of methodological and theoretical issues in the domain of cognitive psychology. Research interests of regular and adjunct faculty in cognition include perception and psychophysics, attention, pattern recognition, reading and language processing, cognitive development, learning and memory, problem solving, neuropsychology, and human-computer interactions. Students interested in this area are encouraged to take courses such as PSYC 5700, PSYC 5703, PSYC 5704 and PSYC 6700 and generate theses in the area of cognition.

Concentration in Developmental Psychology

The Concentration in Developmental Psychology is intended to provide graduate students with an in-depth knowledge of the theoretical and methodological issues associated with the study of child development from birth to adolescence. Faculty interests span the areas of language, cognitive, and social development. Current research in the Department includes topics related to literacy acquisition; bilingualism; peer relationships, aggression and shyness; learning disabilities; conduct disorders and antisocial behaviours; and consequences of offspring exposed prenatally to drugs. Students interested in this area are encouraged to take courses such as PSYC 5501, PSYC 5502, PSYC 6500, and PSYC 6501. Also it is expected that students in this field will generate a thesis in the area of developmental psychology.

Concentration in Human-Computer Interaction

The Concentration in Human-Computer Interaction is designed to provide students with skills to conceive, conduct and report research that improves the usefulness and usability of computer and communication technologies. Examples include the creation and evaluation of human-computer interfaces, the use of psychological principles in the design of

interactive technologies, and studies of the social effects of computer-mediated communication. To pursue the Concentration, students are encouraged to take at least three of PSYC 5105, PSYC 5106, PSYC 6105 and PSYC 6106, take additional courses in related areas (e.g., cognition, social psychology, design) and complete a thesis in the area.

Specialization in Behavioural Neuroscience

Behavioural Neuroscience is the study of the relation between behaviour and the nervous system. This specialty is cross-disciplinary, incorporating neuroanatomy, neurobiology, neuropharmacology, neurophysiology, psychiatry, psychology and cognitive studies. While individual researchers usually specialize in a particular area, behavioural neuroscientists must also be able to appreciate significant research in other fields of neuroscience.

Training in Behavioural Neuroscience extends beyond the boundaries of traditional departments. This area of concentration is offered as a collaborative Specialization in Behavioural Neuroscience by the Institute of Neuroscience at Carleton University and the School of Psychology at the University of Ottawa. Faculty members of the Institute of Neuroscience are from the Psychology and Biology departments and also include adjuncts from the large and diverse Ottawa Neuroscience community. To augment the scope of training provided, faculty members from the Department of Psychiatry (Institute of Mental Health Research, Royal Ottawa Hospital) also participate in the teaching, research training and student supervision. Further details on the Specialization, including faculty members of the Institute of Neuroscience and program requirements of the Specialization are listed in the Neuroscience section of this Calendar. Prospective students are encouraged to contact the Director of the Institute of Neuroscience for current research activities of the participating faculty.

Qualifying-Year Program

Occasionally, candidates with exceptional promise who offer less than Honours B.A. status may be admitted to a qualifying-year program approved by the graduate studies committee and designed to prepare them for master's study. A grade of B- or better must be obtained in each qualifying-year course, and candidates may be required to complete satisfactorily the equivalent of a B.A.(Honours) thesis.

Master of Arts

Admission Requirements

The normal requirement for admission into the master's program is a B.A.(Honours, in Psychology) (or its equivalent) with high honours standing and with credit in the following areas: statistics and design of experiments; experimental psychology; learning or motivation; physiology and/or comparative psychology; and history and/or systems.

Candidates with particular course deficiencies may be required to register in additional courses at Carleton.

The deadline for submitting applications for graduate study in psychology are as follows: February 1 for students requesting financial assistance; June 1 for students not requesting financial assistance but who are seeking admission in September; and November 1 for students not requesting financial assistance who are seeking admission in January.

Program Requirements

The master's program usually consists of 3.0 credits, of which at least two must be at the graduate level (numbered 5000 or higher), and a thesis (equivalent to 2.0 credits) which must be defended at an oral examination. PSYC 5400, or the successful completion of the opting-out examination in quantitative methods, is required of all graduate students. Course credit will not be given for successful completion of the opting-out examination.

Master of Science

The Department of Psychology offers the M.Sc. degree for those students in the behavioural neuroscience specialization. For the neuroscience specialization, the candidate must fulfil the normal program requirements together with the requirements of the specialization. For further details, see the Neuroscience section of this Calendar.

Academic Standing

A grade of B- or better is normally required in each of the credits counted towards the M.A. or M.Sc. degree. The Department is prepared on occasion to recommend to the Dean of the Faculty of Graduate Studies and Research that a candidate be allowed a grade of C+ in 1.0 credit or each of two 0.5 credits. In the case of PSYC 5400, such a recommendation will be based on successful completion of the qualifying examination. This option is limited to those who pass the examination within two successive offerings of it, and who maintain continuous registration as graduate students between the first registration in PSYC 5400 and the taking of the examination.

Doctor of Philosophy

Admission Requirements

The requirements for admission to the Ph.D. program are outlined in the General Regulations section of this Calendar. Scores on the Graduate Record Examination are optional.

The Ph.D. program in psychology normally will be undertaken on a full-time basis; however, in cases of exceptional merit, the Department will accept a few candidates for the degree on a part-time basis. The time limit for completion of Ph.D. degree requirements for those who enter the program on a part-time basis will be the same as for those who enter on a full-time basis and subsequently register for part-time study: that is, eight calendar years. (See General Regulations, Section 13, Time Limits.)

Applicants should note that of the B.A., M.A., M.Sc., and Ph.D. degrees in Psychology, ordinarily only two may be taken at Carleton University.

Program Requirements

The minimum program requirements for the Ph.D. degree in Psychology are as follows:

- 10.0 credits, with a grade of B- or better in each credit;
- PSYC 5400 (1.0 credit) or the opting-out examination; and one of PSYC 5401, PSYC 5402, PSYC 5403 or PSYC 5406 or other as approved by the graduate committee are required of all Ph.D. graduate students. In the case of success in the opting-out examination in PSYC 5400, another 1.0 credit is substituted;
- Satisfactory completion of PSYC 6905 (1.0 credits);
- A thesis equivalent to 5.0 of the required 10.0 credits which must be defended at an oral examination.

All Ph.D. candidates are required to submit a thesis prospectus. The prospectus examination will normally be successfully completed within seven calendar terms of the student's initial registration for full-time students and ten terms for part-time students.

Comprehensive Examination

All Ph.D. candidates in psychology are required to successfully complete PSYC 6905, Comprehensive Examination (1.0 credit). The Comprehensive examination includes both a written and an oral examination on a topic distinct from the topic of the thesis. The topic of the comprehensive examination shall be approved by the graduate studies committee of the Department of Psychology. There are two optional forms for the written and the oral examination: either a major essay or a research grant proposal. The submission of the written portion of the examination will be followed within one to three weeks by a comprehensive oral examination, which is not restricted to issues raised by the written portion.

The comprehensive examination must be completed successfully before the Ph.D. prospectus meeting is scheduled. Students are required to successfully complete the Comprehensive Examination by the end of the fourth term of the student's initial registration for full-time students in the Ph.D. program or by the end of the sixth term of the student's initial registration in the part-time Ph.D. program.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

PSYC 5001 [0.5 credit] (formerly 49.501)
Qualitative Research Methods in Psychology
Introduction to various non-numerical, interpretive research methods. Attention will be devoted to the philosophical underpinnings of qualitative research, methods collecting and analyzing qualitative data, and issues regarding sampling, reliability, and validity.
Prerequisite: PSYC 5400 or permission from the instructor.

PSYC 5100 [0.5 credit] (formerly 49.510)
Research Methods in Social Psychology
This course focuses on essential methodological issues in social psychology. These include experimental, quasi-experimental, correlational, survey and field research methods, as well as factors affecting the validity of findings and ethics.

PSYC 5101 [0.5 credit] (formerly 49.511)
Seminar in Social Psychology
This seminar deals with classic and current theoretical issues and research findings in the areas of social psychology, personality, community, social-developmental and applied social psychology.

PSYC 5102 [0.5 credit] (formerly 49.512)
Group Processes
The interface between the person and the group has been alleged to be the uniquely defining feature of social psychology. This course examines the evidence for this assertion historically, and across cultures, in an attempt to place current publications in group processes in broader temporal and cultural contexts than research reports normally permit.

PSYC 5103 [0.5 credit] (formerly 49.513)
Attitudes
This seminar will survey classic and contemporary theories and research examining the nature of attitudes, the attitude-behaviour relation, and factors affecting attitudes.

PSYC 5104 [0.5 credit] (formerly 49.514)
Psychology of Women
This seminar will consider and evaluate research concerning the psychology of women, including research methods, gender roles and gender differences.

PSYC 5105 [0.5 credit] (formerly 49.515)
Fundamentals of Computing for Psychologists
A survey of computer and communication hardware and software. The course is designed to make psychologists aware of concepts and terminology used by engineers and programmers in planning computer applications. The course will have a weekly laboratory.
Prerequisite: one course in computer programming or equivalent.

PSYC 5106 [0.5 credit] (formerly 49.516)
Applications of Computers to Thinking, Problem Solving, and Decision Making
A survey of literature in such fields as artificial intelligence, database management, computer-aided instruction, simulation and forecasting, and computer-mediated communication. Psychological principles in the design, use, and evaluation of these cognitive aids will be stressed.
Prerequisite: PSYC 5105.

PSYC 5107 [0.5 credit] (formerly 49.517)
Psychology of Family Violence
In this seminar, students examine the biopsychosocial antecedents and consequences of the abuse and neglect of children, partners and elders within the family. The efficacy of preventive and treatment strategies is also assessed, as are current controversies and research methods in the area.

PSYC 5108 [0.5 credit] (formerly 49.518)
Social Psychological Issues in Human Assessment
A detailed critique of orthodox assessment methodologies and exposure to recent developments in the appraisal of human competencies, personality, and social interaction.

PSYC 5109 [0.5 credit] (formerly 49.519)
Historical and Social Foundations of Social Psychology
This course is a history of psychological social psychology (1890s to 1960s). Emphasis is placed on the development of social psychology as both an experimental and an interpretive science. Some attention is given to historiographic issues and the history of the human sciences more generally.

PSYC 5200 [1.0 credit] (formerly 49.520)
(Biology 61.534)
Basics of Neuroscience
A comprehensive neuroscience course from cellular levels to neural systems and behavior. Topics covered include aspects of neuroanatomy, neurophysiology, neuropharmacology and behavioural and cognitive neuroscience. (Also listed as PSY 6201 at the University of Ottawa.)

PSYC 5201 [0.5 credit] (formerly 49.521)
Environmental Psychology and Social Ecology
This course considers research and applications in the fields of environmental psychology and social ecology. Topics may include spatial behaviour, territoriality, behaviour setting analysis, personal space, psychological assessment of environments and psychological aspects of environmental design.

PSYC 5202 [0.5 credit] (formerly 49.522)
Psychology and Criminal Justice
A critical review of the contributions of psychological concepts, technology and research methodology to the analysis of selected issues in law and criminal justice. Topics may include victim studies, risk assessment, offender rehabilitation, police studies expert testimony, eyewitness testimony, and judicial decision making.

PSYC 5203 [0.5 credit] (formerly 49.523)
Psychology in the Human Services
This seminar will review and evaluate non-clinical roles for psychologists in the human services. The major roles reviewed include those of consultant, researcher, evaluator, trainer, and policy analyst.

PSYC 5209 [0.5 credit] (formerly 49.529)
Psychology of Health and Illness
A critical examination of scientific theory and research on the role of psychological factors in health and illness, and the use of psychological interventions in treating illness and maintaining health. Topics include the biopsychological model of illness, stress and coping, psychoneuroimmunology, personality, and stress management.

PSYC 5300 [0.5 credit] (formerly 49.530)
Perceptual Processes
Theoretical and empirical issues of the area of perception. The topics may include:

psychophysics, constancies, depth perception, pattern recognition, iconic memory, attention, hemispheric specialization.

PSYC 5301 [0.5 credit] (formerly 49.531)
Psychophysics
A study of classic and contemporary psychophysical methods. Applications to cognition will be included.

PSYC 5400 [1.0 credit] (formerly 49.540)
Quantitative Psychology I: Univariate Techniques
Applications of the general linear model including analysis of variance and multiple regression: prediction and estimation. Extensive use is made of computer statistical packages.

PSYC 5401 [0.5 credit] (formerly 49.541)
Quantitative Psychology II: Multivariate Techniques
Applications of multivariate statistical techniques with psychological data including multivariate analysis of variance, canonical correlation, discriminant function analysis, and factor analysis. Extensive use is made of computer statistical packages.
Prerequisite: PSYC 5400.

PSYC 5402 [0.5 credit] (formerly 49.542)
Descriptive and Nonparametric Statistics
An overview of methods for assisting in the detection and explanation of patterns in data that do not satisfy parametric test assumptions. Topics may include exploratory data analysis, information analysis, prediction analysis, ordinal pattern analysis, and conceptual issues in statistics.
Prerequisite: PSYC 5400.

PSYC 5403 [0.5 credit] (formerly 49.543)
Measurement and Scaling: Theory, Methods, and Applications
Theoretical foundations and applications of extensive, conjoint, difference, utility and subjective probability, fundamental measurement systems are studied. Data theory, derived measurement systems, multidimensional scaling of similarities and preference data, and the related computer based routines are also explored.
Prerequisite: PSYC 5400.

PSYC 5406 [0.5 credit] (formerly 49.546)
Quasi-experimental Design and Evaluation Research
Coverage of methodological and statistical problems occurring in the field settings and program evaluations.
Prerequisites: PSYC 5400, and one of PSYC 5401, PSYC 5402, PSYC 5403.

PSYC 5407 [0.5 credit] (formerly 49.547)
Tests and Measurements I: Intellectual/ Cognitive
This course is designed to assist students learning of basic cognitive/intellectual assessment procedures. Students will be required to

administer and interpret a variety of tests such as the WAIS-R, Weschler Memory Scale, Rey Auditory Verbal Learning Test, and Buschke's Cued Recall Test.
Prerequisite: Undergraduate course in testing or psychometrics.

PSYC 5408 [0.5 credit] (formerly 49.548)
Tests and Measurements II: Personality
This course is designed to assist students learning of basic projective and non-projective personality tests. Students will be required to administer and interpret a variety of personality tests such as MMPI, Rorschach, 16-PF, and STAI. Applied experience will be stressed.
Prerequisite: PSYC 5407.

PSYC 5501 [0.5 credit] (formerly 49.551)
Developmental Psychology I
A detailed examination of selected issues in developmental psychology.

PSYC 5502 [0.5 credit] (formerly 49.552)
Developmental Psychology II
A continuation of PSYC 5501.

PSYC 5601 [0.5 credit] (formerly 49.561)
Contemporary Research in Personality
Current controversial issues in personality research, and selected theoretical and research studies in personality.

PSYC 5700 [0.5 credit] (formerly 49.570)
Advanced Topics in Cognition I
An in-depth study of a specific topic in the area of basic cognitive processes. Topics will vary from year to year and may include judgmental processes, object identification, selective attention and spatial cognition.

PSYC 5703 [0.5 credit] (formerly 49.573)
Cognition I
A survey of issues and research methodologies in basic cognitive processes. Topics may include detection and processing of sensory signals, pattern recognition, attention, mental imagery and automaticity.

PSYC 5704 [0.5 credit] (formerly 49.574)
Cognition II
A survey of issues and research methodologies in higher-level cognitive processes. Topics may include memory, representation of knowledge, decision processes, and the procedural/ declarative controversy. The course may be focused on a particular area (e.g. reading, transfer in problem solving).

PSYC 5706 [0.5 credit] (formerly 49.576)
Behaviour Modification
Special problems, topics, and projects related to behaviour modification.

PSYC 5800 [0.5 credit] (formerly 49.580)
Special Topics in Psychology
The topics of this course will vary from year to year, and will be announced in advance of the registration period.

PSYC 5900 [0.5 credit] (formerly 49.590)
Directed Studies
An investigation in depth of selected problems in psychology by means of directed library research. Registration is restricted, permission to register being granted only by the graduate committee. A final report must be filed in the departmental office prior to submission of course grade.

PSYC 5901 [0.5 credit] (formerly 49.591)
Independent Research
Permission to register and approval of research plan must be obtained from the graduate committee. A final research report must be filed in the departmental office prior to submission of course grade. The course may be repeated for credit.

PSYC 5903 [0.5 credit] (formerly 49.593)
Practicum in Psychology
The practicum offers master's level students the opportunity to gain experience in a range of applied psychology settings with the goal of integrating academic and practical aspects of psychology. This course cannot be repeated for credit. Students will receive a grade of satisfactory or unsatisfactory. Details are available from the Department.

PSYC 5909 (formerly 49.599)
M.A. Thesis

PSYC 6000 [0.5 credit] (formerly 49.600)
Systems of Psychology
Historical research methods on the study of psychological movements and problems of the late nineteenth and early twentieth centuries; may be repeated for credit. (Open with permission to advanced undergraduates.)

PSYC 6103 [0.5 credit] (formerly 49.613)
Sleeping and Dreaming
Major emphasis will be placed on recent theory, method and measurement in sleep and dream research: developmental neuro-cognition, psychophysiology and chronobiology. Disorders of sleeping behaviour and experience; cross-species comparative approaches. Functions of sleeping and dreaming; effects of these behaviours on waking behaviour and experience.

PSYC 6105 [0.5 credit] (formerly 49.615)
Psychological Aspects of Computer Use
An investigation of human factors related to the effective design of computer hardware and software. Topics may include the design and evaluation of information search procedures, graphic displays, and operation manuals on the assessment of usability. A research project will be required.

PSYC 6106 [0.5 credit] (formerly 49.616)
Social Aspects of Computer Use
An investigation of the social psychological factors affecting the use of computers and the social consequences of their use Topics may include the use of computers in higher education and the social consequences of the Internet for the Third World.

PSYC 6200 [1.0 credit] (formerly 49.620)
(BIOL 6303)
Advanced Seminar in Neuroscience
A seminar focusing on the active research areas and interests of faculty, guest lecturers and graduate students as well as current trends in diverse areas of neuroscience. (Also listed as PSY 6202 at the University of Ottawa)
Prerequisite: PSYC 5200.

PSYC 6204 [0.5 credit] (formerly 49.624)
(BIOL 6204)
Neuroscience Techniques I
Completion of a research project carried out under the supervision of a neuroscience faculty member, normally not the current supervisor. The student will learn a new neuroscience technique and apply it to a research objective. The course can be repeated for different projects. Students must obtain approval from the Director of the Neuroscience.

PSYC 6300 [0.5 credit] (formerly 49.630)
Special Topics in Neuroscience
An in depth study of current topics in neuroscience. Course content varies yearly and has recently included cognitive neuroscience, neuropharmacology, neurodegeneration, behavioural medicine and molecular neuroscience.

PSYC 6500 [0.5 credit] (formerly 49.650)
Research Seminar in Developmental Psychology I

PSYC 6501 [0.5 credit] (formerly 49.651)
Research Seminar in Developmental Psychology II

PSYC 6601 [0.5 credit] (formerly 49.661)
Seminar in Human Neuropsychology I
A broad and intensive consideration of selected topics in human neuropsychology, integrating findings from psychology with related medical literature.

PSYC 6602 [0.5 credit] (formerly 49.662)
Neuropsychological Assessment
Review of the rationale and practice of diagnosis and treatment based on neuropsychological test results. Reliability and validity of test batteries such as the Halstead-Reitan and the Luria-Nebraska are studied. Clinical analysis of patient protocols, including degenerative diseases, psychiatric disorders, seizures, head injury, brain tumors.
Prerequisite: PSYC 6601.

PSYC 6603 [0.5 credit] (formerly 49.663)
Seminar in Human Neuropsychology II
A broad and intensive consideration of selected topics in human neuropsychology, integrating findings from psychology with related medical literature.

PSYC 6604 [0.5 credit] (formerly 49.664)
Theories of Brain Dysfunction in Psychopathology
A review of neuropsychological theoretical explanations and empirical findings regarding brain functioning in a variety of organic and psychiatric disorders, such as autism, schizophrenia, minimal brain dysfunction, anorexia nervosa, aphasia, and memory disorders. Disorders are examined from neurological, psychological, biochemical, and neuropsychological points of view.
Prerequisite: PSYC 6601.

PSYC 6700 [0.5 credit] (formerly 49.670)
Advanced Topics in Cognition II
An in-depth study of a specific topic in higher-level cognitive processes. Topics will vary from year to year and may include mathematical knowledge and processes, problem solving, or models of reading.

PSYC 6800 [0.5 credit] (formerly 49.680)
Special Topics in Psychology
The topics of this course will vary from year to year, and will be announced in advance of the registration period.

PSYC 6900 [0.5 credit] (formerly 49.690)
Directed Studies
Same description as PSYC 5900.

PSYC 6901 [0.5 credit] (formerly 49.691)
Independent Research
Permission to register and approval of research plan must be obtained from the graduate committee. A final research report must be filed in the departmental office prior to submission of course grade. The course may be repeated for credit.

PSYC 6903, PSYC 6904 [0.5 credit] (formerly 49.693, 49.694)
Practicum in Psychology
The practicum offers Ph.D. students the opportunity to gain experience in a range of applied psychology settings with the goal of integrating academic and practical aspects of psychology. This course cannot be repeated for credit. Students will receive a grade of satisfactory or unsatisfactory. Details are available from the Department.

PSYC 6905 [1.0 credit] (formerly 49.695)
Comprehensive Examination
Available only to Ph.D. students. Students will receive a grade of Satisfactory or Unsatisfactory.

PSYC 6909 (formerly 49.699)
Ph.D. Thesis

Public Policy and Administration

Dunton Tower 1021
Telephone: (613) 520-2547
Fax: (613) 520-2551
E-mail: public_administration@carleton.ca
www.carleton.ca/sppa

The School

Director of the School, L.A. Pal

Co-ordinator, Canadian Concentration, P.A. Ryan

Co-ordinator, Development Concentration, M.A. Bienefeld

Co-ordinator, Innovation, Science and Environment Concentration, P.A. Ryan

Co-ordinator, Doctoral Program, D. Swartz

The School of Public Policy and Administration at Carleton University is a leading national and international centre for teaching and research in public administration and public policy. Since being established in 1953, the School has helped to prepare individuals for professional careers and opportunities in the public sector, both in Canada and abroad.

The nature of the public sector has always been subject to change, but perhaps never more than in recent years. Today the public sector can be seen as embracing not only the traditional government departments and agencies, but also political organizations, interest groups, consulting and research firms, the voluntary sector, organizations that provide public services on contractual bases, as well as international agencies and institutions of higher learning. The graduate programs of the School treat the public sector in this contemporary context.

The School offers graduate programs of study and research in the fields of public administration and public policy leading to the Master of Arts in Public Administration, the Graduate Diploma in Public Administration, and the Doctor of Philosophy in Public Policy. These programs are designed both for individuals who wish to work in the public sector, and for those who are already doing so but who wish to broaden or strengthen their conceptual and technical skills. Prospective applicants are urged to consider carefully the alternative programs so as to select the one best suited to their interests, background, and academic qualifications.

The M.A. program provides a broad and balanced exposure to public policy development, public management and policy implementation. The D.P.A. program provides an introduction to the same subjects. Both the M.A. and the D.P.A. are offered in three alternative areas of concentration: Canadian Public Policy and

Administration (the Canadian Concentration); Development Policy and Administration (the Development Concentration); and Innovation, Science and Environment Policy and Administration (the I.S.E. Concentration). The Development Concentration is offered in co-operation with the Norman Paterson School of International Affairs.

The Ph.D. program involves the intensive study of the formation and evolution of public policy in Canada and, from a comparative perspective, in countries of the OECD.

Each of these graduate programs is described in detail below. Further information or application packages can be obtained by contacting the School of Public Administration.

Master of Arts

The overall objective of the M.A. program is to provide individuals with a balanced conceptual and technical ability to understand and contribute to policy development, public management, and policy implementation.

Under this objective, the Canadian Concentration provides an advanced understanding of the public sector through interdisciplinary insights drawn from political science, economics and management, as applied within the framework of Canadian and comparative institutions, laws and ideas. It also enables individuals to specialize in particular policy fields and aspects of management, both through study and through co-operative education in the public sector.

The Development Concentration provides an advanced understanding of the problems and opportunities that confront various types of national administrative systems and public sectors in their efforts to promote sustainable social and economic development in an increasingly interdependent and competitive global system.

The Innovation, Science and Environment Concentration provides an advanced understanding of the problems and opportunities that confront governments, firms and society in making and implementing innovation, science and environment policies in an increasingly knowledge and information-based economy and society.

These overall and particular objectives are consistent with the School's view of what is fundamental to education in the field of public administration. This view is:

- that democratic ideals and practices are central to government and to the public sector broadly defined

- that a balance of conceptual and technical skills is needed to understand the linked activities of policy development (how and why policy is made), public management (how the public sector is structured, staffed and resourced) and policy implementation (how policy intentions are carried out, including the grievances and appeals of citizens and clients)

- that these advanced conceptual and technical skills come from exposure to a variety of academic disciplines

- that professional education in public administration and policy analysis requires a balance of theory and practice

The relevance of this view has been borne out by the success of graduates of the School who now work in many areas of the public sector, in Canada and abroad, including government departments, political organizations, interest groups, consulting and research firms, the voluntary sector, international agencies, and institutions of higher learning.

A co-op option is available to full-time students in the M.A. program. Students admitted to this option must satisfactorily complete at least two work terms in order to graduate with a co-op designation on their transcripts and diplomas. These work terms are four months in duration and locate students in government departments or other organizations in order to work at a junior officer level. They provide students with opportunities to integrate the theoretical and practical aspects of public administration. During a work term, students will register in one of the co-op work term courses: PADM 5301, PADM 5302, or PADM 5303. While on a work term, students are limited to an additional 0.5 credit course.

Program Schedules

The M.A. program may be taken under three schedules: full-time, part-time or a mixture of the two.

- The full-time schedule enables students to complete the program in two years (four or five academic terms).

- The part-time schedule enables students, taking from two to four half credits over one year, to complete the program in five to eight years. Courses are regularly scheduled in evening sections.

- The mixed full-time, part-time schedule enables students to complete the program in a period intermediate to those above. The mixed schedule applies to full-time students who shift to part-time study during a co-operative placement, or part-time students who shift to full-time study in the event of study leave.

The duration of the program depends upon the advanced standing with transfer of credit that students receive upon admission. Advanced standing is discussed below under program requirements.

Admission Requirements

Applicants must have a demonstrated ability to study and communicate in English. A TOEFL score of 580 or higher is normally required for students whose first language is not English.

Applicants must have a bachelor's degree (or the equivalent) with high honours standing or better from a recognized university. The level of academic performance and potential demonstrated within the degree is more important than the discipline. Indeed, students enter the program from a wide variety of academic backgrounds in the social sciences, humanities, sciences and engineering. The School also considers mid-career applicants who do not have a bachelor's degree, but who have demonstrated professional excellence over several years of managerial work in the public sector.

Applicants normally must have completed a university course covering micro- and macroeconomic theory (ECON 1000 or the equivalent), with the required standing. In addition, applicants must have a working knowledge of algebra.

Applicants to all concentrations normally must have completed a relevant political science course with the required standing.

In some cases, applicants may be admitted to the program despite not having completed one of these pre-requisite courses in economics or political science, upon the condition that the course be completed (with a grade of at least B-) in the first year of their program.

Note that, because of the number of applications received, possession of these admission requirements does not, in itself, guarantee admission to the program.

Application packages may be obtained by contacting the School of Public Policy and Administration. Applicants for full-time study who wish to be considered for financial assistance and scholarships must ensure that all application materials are received by March 1.

Program Requirements

Master of Arts

The M.A. program comprises 8.0 credits. Upon admission, students may receive advanced standing with transfer of credit for up to 3.0 required credits. Advanced standing can be granted for no more than two courses from the

"outer core" (see below). Advanced standing is granted only if previous academic work is judged to be equivalent to the required courses. Advanced standing will be determined on an individual basis on consultation with the School and the Faculty of Graduate Studies and Research and pursuant to Section 6.1 of the General Regulations section of this Calendar. In general, a grade of B+ or better is necessary in the equivalent courses in order to receive advanced standing.

The composition of the required and optional courses that make up the M.A. program differs between the Canadian, the Development, and the Innovation, Science and Environment (I.S.E.) Concentrations. All three concentrations involve 8.0 credits, made up of: a) an "inner core" of seven required courses (3.5 credits); b) an "outer core" of two courses (1.0 credits), chosen from a menu of five or six courses; c) seven optional courses (3.5 credits).

A. Inner Core

Concentration		
Canadian	I.S.E.	Development
PADM 5608	PADM 5608	PADM 5608
PADM 5300	PADM 5300	PADM 5300
PADM 5501	PADM 5501	PADM 5501
PADM 5203	PADM 5203	PADM 5203
PADM 5202	PADM 5401	INAF 5307
PADM 5607	PADM 5600	INAF 5007
PADM 5000	PADM 5400	PADM 5001

B. Outer Core

Two courses (at least one of which must be PADM 5502 or PADM 5603) selected from:

Concentration		
Canadian	I.S.E.	Development
PADM 5502	PADM 5502	PADM 5502
PADM 5603	PADM 5603	PADM 5603
PADM 5004	BUSI 5700	PADM 5107
PADM 5204	BUSI 5701	INAF 5008
PADM 5306	PADM 5404	PADM 5808
	PADM 5403	

C. 3.5 optional credits consisting of:

(i)   3.5 credits selected from SPPA 5000-level course offerings, or from graduate courses in other disciplines if approved by the graduate supervisor; or

(ii)   A thesis (equivalent to 2.0 credits) and 1.5 credits selected from SPPA course offerings, or from graduate courses in other disciplines, if approved by the graduate supervisor; or

(iii)   A research essay (equivalent to 1.0 credit) and 2.5 credits selected from SPPA course offerings, or from graduate courses in other disciplines, if approved by the graduate supervisor.

Notes:

Normally, optional courses may only be taken only when the student has completed and/or obtained advanced standing in at least seven courses from the inner and outer cores.

Students may take as options any of the required courses over and above the minimum number specified.

Ph.D. courses are open to master's students with approval of the School.

Academic Standing

A grade of B- or better must normally be obtained in each course credited towards the master's degree. A candidate may, with the recommendation of the School of Public Policy and Administration and the approval of the Dean of the Faculty of Graduate Studies and Research, be allowed a grade of C+ in courses totalling 1.0 credit (with no more than .5 credit of C+ allowed in courses in the inner core).

Graduate Diploma in Public Administration

The D.P.A. program provides an introduction to the subjects of policy development, public management, and policy implementation. Students enter the program with widely varying backgrounds, including those who already have advanced degrees but who wish to strengthen or broaden their conceptual and technical skills in public administration.

Program Schedules

The D.P.A. program can be taken under three schedules; full-time, part-time or a mixture of the two. The duration of the program is approximately half that described for the M.A. program.

Admission Requirements

The requirements for admission to the Canadian, the Development and the Innovation, Science and Environment, Policy Concentrations of the D.P.A. are identical to those described for the M.A. Note, however, that students in the D.P.A. are not eligible to receive financial assistance.

Program Requirements

The D.P.A. program comprises 5.0 credits. Upon admission, students may receive advanced standing with transfer of credit for up to 1.0 credit. Advanced standing is granted only if previous academic work is judged to be equivalent to those courses. Advanced standing will be determined on an individual basis on consultation with the School and the Faculty of Graduate Studies and Research and pursuant to Section 6.1 of the General Regulations section of this Calendar. In general, a grade of B+ or better is necessary in the equivalent courses in order to receive advanced standing.

The composition of courses that make up the D.P.A. program differs between the Canadian, the Development, and the Innovation Science and Environment Policy Concentrations.

Canadian Concentration

5.0 credits selected from:
- PADM 5000
- PADM 5004
- PADM 5100
- PADM 5101
- PADM 5202
- PADM 5203
- PADM 5204
- PADM 5300
- PADM 5306
- PADM 5501
- PADM 5502
- PADM 5603
- PADM 5607
- PADM 5608

No more than three of the courses may be selected from PADM 5004, PADM 5100, PADM 5101, PADM 5204 and PADM 5603.

Development Concentration

5.0 credits selected from:
- PADM 5001
- PADM 5101
- PADM 5107
- PADM 5203
- PADM 5204
- PADM 5300
- PADM 5501
- PADM 5502
- PADM 5603
- PADM 5608
- PADM 5808
- INAF 5007
- INAF 5008
- INAF 5307

No more than three of the courses may be selected from PADM 5101, PADM 5107, PADM 5204, PADM 5502, and PADM 5808.

Innovation, Science and Environment Concentration

5.0 credits selected from:
- PADM 5001
- PADM 5002
- PADM 5008
- PADM 5203
- PADM 5300
- PADM 5400
- PADM 5401
- PADM 5403
- PADM 5404
- PADM 5501
- PADM 5502
- PADM 5600
- PADM 5607
- PADM 5608
- PADM 5807
- One of Business BUSI 5700 or BUSI 5701

No more than two of the courses may be selected from PADM 5001, PADM 5002, PADM 5008, PADM 5605, PADM 5001, and PADM 5807.

Academic Standing

All candidates are required to obtain a grade of B- or better in each course in the program. A candidate may, with the recommendation of the School and the approval of the Dean of the Faculty of Graduate Studies and Research, be allowed one grade of C+.

Doctor of Philosophy

The doctoral program in public policy has two primary objectives:

- to contribute to the advancement of research and teaching based on one or more of the various approaches to the political economy of public policy (in OECD countries)

- to develop scholars and researchers for positions in universities, private research institutions, and various other public and private organizations

While the School's M.A. degree outlined above offers exposure to both policy and management, the Ph.D. focuses directly on the study of public policy from both Canadian and comparative perspectives. The formation and evolution of policy in Canada is a primary focus of the program. In addition, Canadian, European, and other international students interested in research with a European-Canadian and North American comparative perspective will also find the program conducive to their work in the fields of specialization offered. Areas of research specialization within the School include: policy institutions and instruments, industrial policy, and social and labour market policy.

A distinguishing feature of the School of Public Policy and Administration is the presence of faculty who strive to integrate political science and economics in their research and teaching. The Ph.D. program is to a considerable extent based on the view that political economy is essential to an understanding of the public sector. It is also based on the view that analyses of what governments do must address the interplay among the various policy fields, instruments, and institutions.

Degree Schedule

The program consists of three academic terms of course work plus preparation and completion of one comprehensive examination, as well as a doctoral thesis. The Ph.D. program in Public Policy normally will be undertaken on a full-time basis; however, in cases of exceptional merit, the School may accept a few candidates for the degree on a part-time basis.

Admission Requirements

Admission will be judged primarily on the applicant's ability to conduct advanced research and to complete the program successfully. Applications should contain at least one essay or paper at the M.A. level written by the applicant. Enrolment is limited and possession of the minimum requirements does not, in itself, guarantee acceptance. To be eligible for financial assistance, application for admission for the fall term must be completed no later than March 1.

Admission requires completion of an M.A. degree in any of public administration, political science, economics, political economy, business administration, law, or similar degree with first class standing (A- average or better in their M.A. work).

Students are advised that a working knowledge of basic calculus is required for completion of the program. Assistance in acquiring these skills is provided by the program. Students requiring additional assistance should consult the Ph.D. Co-ordinator.

Applicants must also successfully complete prerequisites in statistics, political science, and economics as described in detail below. These prerequisites may be satisfied by the completion of appropriate course work at the intermediate undergraduate level or higher in each of the subjects listed.

Completed statistics courses should be approximately equivalent to PADM 5502(described under Graduate Courses, below). Candidates may, with permission of the School, satisfy the statistics prerequisite by completing this course with at least B+ standing concurrently with the Ph.D. program.

Prerequisites in political science and economics must be completed prior to entry. Completed courses in political science should be approximately equivalent to PADM 5607 or PADM 5608. With permission of the Graduate Coordinator, this requirement may be done, as a directed study in the summer, prior to registration in the program, under the supervision of faculty in the School. Completed courses in economics should be approximately equivalent to PADM 5203. This course is usually offered at the School in the summer term and equivalent courses may be taken at most universities throughout the academic year. Applicants should seek advice from the supervisor of the Ph.D. program about whether particular courses are acceptable as prerequisites.

Advanced Standing

Advanced standing will not normally be granted for any of the required courses described below. If granted, advanced standing will be limited to 1.0 credit.

Program Requirements

The program consists of the following elements:

- 4.5 credits of course work
- Preparation for and writing of one comprehensive examination, normally written in August of the first year
- Public defence of a written thesis proposal
- A thesis equivalent to 4.5 credits
- A language requirement

Course Component

Courses will normally be taken in the First year, and the fall of the Second year. Students in the doctoral program are required to complete the following:

- Six 0.5 credits: PADM 6004, PADM 6005, PADM 6006, PADM 6007, PADM 6008,

PADM 6009. A GPA of 9.0 (B+) or better overall must be obtained in these courses before proceeding to the comprehensive examination.

- PADM 6100
- 1.0 credit that constitutes one area of specialization beyond the public policy foundations covered in the core courses. These courses will be chosen by the student after consultation with, and approval by, the student's academic supervisor and the Ph.D. Co-ordinator

These courses will normally be graduate courses offered by the School or by the Departments of Political Science and Economics, or directed studies (PADM 6901 and PADM 6902). However, other courses may be approved. Doctoral students taking courses at the master's level will be subject to enhanced course requirements. When necessary, students must arrange formal approval from the relevant department for admission to courses.

Comprehensive Examinations

Students will write a general comprehensive examination, normally in August of the First year. This examination will focus primarily on material emanating from the required first year courses. At the discretion of the examining board, a candidate whose performance is not fully satisfactory may be asked to take an oral examination or a second written examination.

Preparation for the comprehensive examination will be assisted through a tutorial as described below.

Thesis

Following the successful completion of the comprehensive examinations, students will prepare a formal thesis proposal under a committee composed of the supervisor and two other faculty members. The thesis supervisor will normally be a faculty member from the School of Public Policy and Administration. Each committee must consist of at least one political scientist and one economist. Under normal circumstances, the proposal must be defended by the end of the fall term of the third year of full-time registration. The thesis must demonstrate an advanced ability to integrate the politics and economics of public policy. The thesis must be defended at an oral examination.

Language Requirement

Students will be required to demonstrate a reading knowledge of French. Another language may be substituted for French, if it is essential for the thesis.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

PADM 5000 [0.5 credit] (formerly 50.500)
Public-Sector Management and the Canadian Political System
An examination of the principles and processes of public sector management as it functions through the institutions of cabinet-parliamentary government. Both institutional reforms and changes in the philosophy of public sector management are examined in the Canadian federal government and in a comparative context.

PADM 5001 [0.5 credit] (formerly 50.501)
The International Policy Framework
An examination of the international initiatives and rules within which national development policies are developed and implemented.

PADM 5002 [0.5 credit] (formerly 50.502)
The Political Economy of Regulation
An examination of political, economic, legal, and organizational theories of regulation in the Canadian and comparative context, and of the processes and consequences of regulatory practice in selected Canadian public policy fields.
Prerequisite: PADM 5608.

PADM 5004 [0.5 credit] (formerly 50.504)
Implementation, Service Delivery, and Compliance
An examination of the theory and practice of policy implementation, service delivery, and compliance in relation to Canadians as citizens and customers.

PADM 5006 [0.5 credit] (formerly 50.506)
Social Movements, Interests and the Policy Process
An examination of the roles of social movements and interests in the policy process in a Canadian and comparative context.

PADM 5007 [0.5 credit] (formerly 50.507)
Comparative Research on Policy and Policy Management
An examination of methodologies and issues of comparative research on policy and public management among and between developed and developing countries.

PADM 5008 [0.5 credit] (formerly 50.508)
Environmental Policy
An examination of Canadian environmental policies and programs set in a comparative political-economic and institutional context. Also offered at the undergraduate level, with difference requirements, as PADM 4008, for which additional credit is precluded.

PADM 5009 [0.5 credit] (formerly 50.509)
Health Policy
An examination of Canadian health policies and programs set in a comparative political-economic and institutional context. Also offered at the undergraduate level, with different requirements, as PADM 4009, for which additional credit is precluded.

PADM 5100 [0.5 credit] (formerly 50.510)
Management Accounting
An introduction to the principles and concepts of financial and management accounting. It includes illustrations of how accounting data can assist in the decision-making process of private and public organizations, and the limitations of that data.

PADM 5101 [0.5 credit] (formerly 50.511)
Financial Management
An introduction to several concepts and techniques relevant to obtaining long term funds (debt and equity), and to comparing alternative uses of those funds (NPV and IRR). Other topics may include: financial ratios; pension management; and derivative contracts.

PADM 5103 [0.5 credit] (formerly 50.513)
Budget Decision Making and Budgeting
A study of selected aspects of the expenditure and revenue budget and budgetary process at all levels of government. Student papers are oriented towards critical review of actual budgets and budgetary processes.
Prerequisites: PADM 5203 and PADM 5608

PADM 5105 [0.5 credit] (formerly 50.515)
Management in the Public Service
An examination through cases and research of selected problems and issues in public service management. The specific focus of the course will change each year; some topics include human resources management, government investment, and pricing decisions.

PADM 5106 [0.5 credit] (formerly 50. 516)
Urban and Local Government Management
An analysis of the principal issues and processes of Canadian urban and local government management and administration.

PADM 5107 [0.5 credit] (formerly 50.517)
Project Management
An examination of the managerial, organizational and financial issues and processes involved in the development and implementation of development projects.

PADM 5109 [0.5 credit] (formerly 50.519)
Management in the Para-Public Sector
An examination of managerial theory and practice in the para-public sector including voluntary organizations, interest groups, state-owned and mixed enterprises, and partnership arrangements.

PADM 5200 [0.5 credit] (formerly 50.520)
Public-Sector Investment and Pricing
An examination of theory and practice related to decision making about public-sector investment and pricing policy, particularly large-scale projects and programs. Applied cost-benefit analysis (discount rates, marginal cost and shadow pricing, and the handling of risk and uncertainty) in large-scale public investment choices.
Prerequisite: PADM 5203

PADM 5202 [0.5 credit] (formerly 50.522)
Macroeconomics for Management and Policy
Introductory knowledge of macroeconomics is presumed (subjects such as aggregate supply and demand, and concepts such as the multiplier). Contemporary macroeconomic issues (including active short-run stabilization policy, long-run growth, deficits and debt) and the conceptual frameworks available to analyze these issues.

PADM 5203 [0.5 credit] (formerly 50.523)
Microeconomics for Management and Policy
Introductory knowledge of microeconomics is presumed (subjects such as the competitive model and concepts such as elasticity). Consumer and producer theory, and certain exceptions to the competitive model that are particularly relevant to public policy (including externalities, public goods, imperfect competition).

PADM 5204 [0.5 credit] (formerly 50.524)
Applied Microeconomic Policy Analysis
An examination of how microeconomic theory can be applied to analyze actual public policy problems and issues.
Prerequisite: PADM 5203.

PADM 5205 [0.5 credit] (formerly 50.525)
The Canadian Economy
An overview of Canadian economic development and how it has been affected by governments. Topics may be drawn from monetary, fiscal, industrial, trade, labour-market or competition policies, viewed in contemporary and historical contexts.
Prerequisites: PADM 5202 and PADM 5203.

PADM 5208 [0.5 credit] (formerly 50.528)
Management Information Systems
An examination of the fundamentals of MIS: the nature of systems, information, and management processes, including concepts of data-processing technology, systems design, organizational impacts of information systems, and hardware and software considerations.

PADM 5300 [0.5 credit] (formerly 50.530)
Organization Theory
Major theoretical approaches to the study of organizations, including bureaucratic theory, scientific management, human relations, class theory and gender theory. Developments such as technology and organization, total quality management, empowerment and demo-cratization strategies, and quality of working life.
Prerequisite: PADM 5000 or the equivalent.

PADM 5301 (formerly 50.531)
Co-operative Work Term
Prerequisites: Registration in the Co-operative Education Option of the Master of Arts program and permission of the School.

PADM 5302 (formerly 50.532)
Co-operative Work Term
Prerequisites: Registration in the Co-operative Education Option of the Master of Arts program and permission of the School.

PADM 5303 (formerly 50.533)
Co-operative Work Term
Prerequisites: Registration in the Co-operative Education Option of the Master of Arts program and permission of the School.

PADM 5306 [0.5 credit] (formerly 50.536)
Law of Public Authorities I
The legal environment of Canadian public administration, Canadian law, institutions and processes. Introduction to Canadian legal history, adversarial adjudicative procedure, delegating power to public authorities. Criminal prohibition and licensing to influence behaviour, procedural justice in government decision making, controls on public authorities, enforcement of ethics.

PADM 5307 [0.5 credit] (formerly 50.537)
Law of Public Authorities II
An examination of characteristics and selected problems of control of administrative action. Topics include: varieties of traditional and constitutional, legal and judicial control, impact of the Charter, reforms to administrative law control systems in Canada, and comparisons with developments outside Canada. Also offered at the undergraduate level, with different requirements, as LAWS 4507, for which additional credit is precluded.
Prerequisite: PADM 5306.

PADM 5308 [0.5 credit] (formerly 50.538)
The Management of Provincial Government
A comparative analysis of public-sector management structures and processes at the provincial level of government. Topics examined include personnel and financial systems, regional administration, public utilities, direct interprovincial program and project management, and international activities of provinces.
Prerequisite: PADM 5000 or the equivalent.

PADM 5400 [0.5 credit] (formerly 50.540)
Science and Technology Policies
An examination of theory and practice regarding governmental policies for science and technology, and regarding the use of scientific or objective knowledge in the policy and regulatory processes of government. The course examines concerns regarding the ethical issues and the transparency of science in government.

PADM 5401 [0.5 credit] (formerly 50.541)
Technology, Firms and Systems of Innovation
An examination of broad theories of the political economy of technological change. Such theories include those informed by neo-classical economics, recent evolutionary economic and institutionally oriented innovation studies.

PADM 5403 [0.5 credit] (formerly 50.543)
Science, Risk and Evaluation
An examination of risk-benefit theories and practices and related issues in the evaluation of science and technology; including how they are handled in applied regulatory and policy institutions in selected sectors (e.g. pesticides; health protection; biotechnology).

PADM 5404 [0.5 credit] (formerly 50.544)
The Nature of Science
An examination for non-scientists of key ideas and concepts of science crucial to understanding science as an intellectual activity and experimental process. Ideas and concepts are linked to key areas where policy must have a scientific underpinning (e.g. ecosystems, energy and resources, biotechnology, biodiversity and radiation).

PADM 5501 [0.5 credit] (formerly 50.551)
Quantitative Methods I
An introduction to: descriptive statistics which are used to summarize information; probability theory and sampling distributions, which permit researchers to make valid predictions about population parameters from sample statistics; and the testing of hypotheses about quantitative and qualitative population parameters.

PADM 5502 [0.5 credit] (formerly 50.552)
Quantitative Methods II
The use of correlation and regression analyses to test hypotheses about the relationships between social-economic variables. The course covers simple-linear and multiple regression techniques, the underlying assumptions of ordinary least squares regression, and what can be done when some of these assumptions are violated.
Prerequisite: PADM 5501.

PADM 5509 [0.5 credit] (formerly 50.559)
Tax Policy
An examination of Canadian tax policies set in a comparative political-economic and institutional context. Also offered at the undergraduate level, with different requirements, as PADM 4509, for which additional credit is precluded.

PADM 5600 [0.5 credit] (formerly 50.560)
Sustainable Development and Industrial and Innovation Policy
An examination of sustainable development ideas and ethics and their links to Canadian and comparative industrial and innovation policies including policies that affect: Research & Development incentives, intellectual property, trade and competition, and the knowledge-based services delivered by government to business and consumers. Also offered at the undergraduate level, with different requirements, as PADM 4600, for which additional credit is precluded.

PADM 5602 [0.5 credit] (formerly 50.562)
Planning and Evaluation in Government I
An examination of selected concepts, issues, and processes in applied governmental planning and evaluation, utilizing both Canadian and comparative experiences.

PADM 5603 [0.5 credit] (formerly 50.563)
Qualitative Research in Public Organizations
This course deals with methods used in qualitative social research. The topics covered include the formulation of research problems, research design and techniques for collecting and managing non-quantitative evidence, and the role of qualitative research in the analysis of public policies and programs.
Prerequisite: PADM 5602.

PADM 5604 [0.5 credit] (formerly 50.564)
Social Policy
A seminar which will study the nature and historical development of social programs and the welfare state in capitalist countries, with particular focus on Canada. The course will concentrate on developing a critical understanding of the social forces shaping these programs and evaluating the implications of current debate on the future of social policy in Canada. Also offered at the undergraduate level, with different requirements, as PADM 4604, for which additional credit is precluded.

PADM 5607 [0.5 credit] (formerly 50.567)
Political Economy of the State
An examination of theories of the modern state, drawing on different political economy traditions (for example, liberal, institutional, Marxist, feminist). It provides an understanding of the central debates on the proper role of government that have shaped the state in the past, and that are currently shaping it for the future.

PADM 5608 [0.5 credit] (formerly 50.568)
Policy and Decision Making
An examination of policy analysis: definition, design, implementation, evaluation. Formal institutional structures and processes of policy formulation and implementation, theoretical issues concerning how policy is grounded in an understanding of the state, democracy and citizenship.
Prerequisites: PADM 5000 or the equivalent and PADM 5607.

PADM 5609 [0.5 credit] (formerly 50.569)
Economic Models of Politics
An introduction to the application of microeconomic conceptual frameworks to political processes. Topics may include: types of market failure; interest group formation; collective choice mechanisms; the influence of legislative institutions on policy outcomes; principal-agent relationships and the bureaucracy.
Prerequisite: PADM 5203

PADM 5700 [0.5 credit] (formerly 50.570)
Policy Seminar
An examination of one or more selected policy areas. The focus will be an analytical assessment of the selected policy area in terms of its many-sided economic, political, social, legal, quantitative, and administrative complexities. The policy field will change each year.

PADM 5701 [0.5 credit] (formerly 50.571)
Gender and Public Policy
An examination of policy and policy making as they pertain to gender relations within the state as well as in society at large. The course looks at the negative and positive effects of public policy on gender relations in the family and the labour market. Also offered at the undergraduate level, with different requirements, as PADM 4701, for which additional credit is precluded.

PADM 5702 [0.5 credit] (formerly 50.572), PADM 5703 [0.5 credit] (formerly 50.573)
Policy Seminars
An examination of one or more selected policy areas. The focus will be an analytical assessment of the selected policy area in terms of its many-sided economic, political, social, legal, quantitative, and administrative complexities. The policy field will change each year.

PADM 5704 [0.5 credit] (formerly 50.574)
Regional Policy
Theory and practice of regional policy - the Canadian and Third World experience. Regionalism and regional economic concerns, alternative policy approaches, a critical review of Canadian efforts with emphasis on how federalism shapes perceptions of regional issues and influences the approach to solutions. Also offered at the undergraduate level, with different requirements, as PADM 4704 for which additional credit is precluded.

PADM 5705 [0.5 credit] (formerly 50.575)
Advanced Statistical Policy Analysis
An examination of econometric research on selected policy issues. The issues considered vary each year and the analysis incorporates the study of selected econometric techniques. The course enables students to evaluate critically applied econometric studies of public policy.

PADM 5801 [0.5 credit] (formerly 50.581)
Human Resources Management
An introduction to the field of human resources management including the roles of human resource departments, employee motivation, staffing, compensation, benefits, training and development and employee relations.

PADM 5804 [0.5 credit] (formerly 50.584)
Industrial Relations and Public Sector Collective Bargaining
An analysis of the basic concepts of industrial relations, with respect to both public- and private-sector employees and organizations.

PADM 5806 [0.5 credit] (formerly 50.586)
Aboriginal Policy
An examination of Canadian policies and programs on aboriginal peoples and aboriginal peoples' own policies as nations set in a comparative political-economic and institutional context. Also offered at the undergraduate level, with different requirements, as PADM 4806, for which additional credit is precluded.

PADM 5807 [0.5 credit] (formerly 50.587)
Trade Policy
An examination of Canadian multilateral and regional trade policies and programs set in a comparative political-economic and institutional context. Also offered at the undergraduate level, with different requirements, as PADM 4807, for which additional credit is precluded.

PADM 5808 [0.5 credit] (formerly 50.588)
Structural Adjustment Policy
An examination of structural adjustment policies and programs with a comparative focus on developing countries, but also including their relations with developed countries.

PADM 5809 [0.5 credit] (formerly 50.589)
Education Policy
An examination of Canadian policies and programs on education set in a comparative political-economic and institutional context. Also offered at the undergraduate level, with different requirements, as PADM 4809, for which additional credit is precluded.

PADM 5901 [0.5 credit] (formerly 50.591)
Directed Studies
A tutorial or directed reading course on selected subjects.

PADM 5902 [0.5 credit] (formerly 50.592)
Directed Studies
A tutorial or directed reading course on selected subjects.

PADM 5903 [0.5 credit] (formerly 50.593)
Directed Studies
A tutorial or directed reading course on selected subjects.

PADM 5907 [1.0 credit] (formerly 50.597)
Special Project in Development Administration

PADM 5908 [[1.0 credit] (formerly 50.598)
Research Essay

PADM 5909 [2.0 credits] (formerly 50.599)
M.A. Thesis

PADM 6004 [0.5 credit] (formerly 50.604)
Policy Fields, Instruments and Institutions I
An examination of comparative and Canadian theories and analyses of policy fields, instruments and institutions, with emphasis on selected fields (including social, labour market and industrial policy) and instruments (including public expenditure, taxation and regulation.) Precludes additional credit for PADM 6000.

PADM 6005 [0.5 credit] (formerly 50.605)
Policy Fields, Instruments and Institutions II
An examination of different approaches to understanding the roles of ideas, interests, and institutions in the policy process from a political science perspective. Topics may include discourse coalitions, policy learning, neo-institutionalism, policy communities, citizenship, community and contemporary challenges to democratic government.
Precludes additional credit for PADM 6000.

PADM 6006 [0.5 credit] (formerly 50.606)
The Political Economy of Public Policy I
An examination of various structural approaches to the political economy of public policy, including institutional, Marxist, and other broad frameworks. Emphasis is placed on the contribution of these approaches to our understanding of social and economic changes and the role of public policy in shaping them.
Precludes additional credit for PADM 6001.

PADM 6007 [0.5 credit] (formerly 50.607)
The Political Economy of Public Policy II
An examination of the microanalytic foundations of the political economy of public policy, with application to selected policy issues. Topics may include welfare economics and public goods, group formation, collective choice mechanisms, voting behaviour, evolution of institutions and norms, principal-agent problems, and bureaucracy.
Precludes additional credit for PADM 6001.

PADM 6008 [0.5 credit] (formerly 50.608)
Economics of Public Policy I
An examination of advanced topics in microeconomic theory, including consumption, production and industrial organization, with application to selected policy issues.
Precludes additional credit for PADM 6002.

PADM 6009 [0.5 credit] (formerly 50.609)
Economics of Public Policy II
Selected application of economic theory to various contemporary public policy problems and issues. Topics chosen for study will vary from year to year. Emphasis is placed on the presentation by students of critical analyses of relevant literature.
Precludes additional credit for PADM 6002.

PADM 6100 [0.5 credit] (formerly 50.610)
Public Policy Research
An examination through analyses of selected current research projects of basic applied research issues, philosophies, and problems in public policy research.
Precludes additional credit for PADM 6003.

PADM 6900 [1.0 credit] (formerly 50.690)
Ph.D. Tutorial
A tutorial specifically designed as preparation for the general comprehensive examination, under the direction of two or more faculty members. The grade to be awarded will be that obtained on the general written examination.

PADM 6901 [0.5 credit] (formerly 50.691)
Ph.D. Specialization Tutorial
A Ph.D. tutorial covering advanced theory and research in an area of specialization generally related to public policy. Specific topics will be selected in consultation with, and must be approved by, the academic supervisor and Ph.D. coordinator.

PADM 6902 [0.5 credit] (formerly 50.692)
Ph.D. Specialization Tutorial
A Ph.D. tutorial covering advanced theory and research in an area of specialization generally related to public policy. Specific topics will be selected in consultation with, and must be approved by, the academic supervisor and Ph.D. coordinator.

PADM 6909 [5.0 credits] (formerly 50.699)
Ph.D. Thesis
Students will normally be supervised by faculty in the School of Public Administration but may also seek supervision from faculty in other social sciences departments, schools, and institutes.

Religion

Dunton Tower 2121
Telephone: (613) 520-2100

The Program

Coordinator and Supervisor of Graduate Studies, J.G. Ramisch

The Religion program offers studies leading to the Master of Arts.

Master of Arts

Admission Requirements

The minimum requirement for admission to the master's program is an Honours bachelor's degree in religion (or the equivalent) with at least high honours standing.

Applicants who do not hold an Honours degree in religion (or the equivalent) will be required to register in a qualifying-year program before proceeding to the master's program.

The regulations governing the qualifying year are outlined in the General Regulations section of this Calendar.

Program Requirements

Students are required to complete 5.0 credits as follows:

- RELI 5000
- RELI 5001
- RELI 5002
- RELI 5003
- RELI 5909

RELI 5001 and RELI 5002 must be taken in two different areas other than the student's thesis area. Seminars in other units may be substituted for RELI 5001 and RELI 5002 with permission of the department. The department particularly encourages students to consider ANTH 5403 (also listed as RELI 5403) as a substitute for RELI 5001 or RELI 5002 if anthropology of religion is not their thesis area.

The student's program will be worked out in consultation with, and with the approval of, the department's supervisor of graduate studies and its committee on graduate studies. The prescribed program will take into account the student's background and special interests, as well as the research interests and competence of the staff.

Deadlines

Thesis Proposal

Full-time students will normally submit their thesis proposal to the thesis proposal board by the end of the first month of their second term in the master's program.

Thesis

Regulations governing requirements for the master's thesis, including deadlines for submission, are outlined in the General Regulations section of this Calendar, Section 12.

Guidelines for Completion of Master's Degree

Full-time students in the master's program are normally expected to complete all requirements within two years of entry into the program. Part-time students normally complete all requirements within five years of the date of entry into the program.

Language Requirements

The student will be required to acquire, or to demonstrate that he/she already has, a reading knowledge of whatever language is essential to his/her research. Students are advised to consult the Supervisor of Graduate Studies for further regulations.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

RELI 5000 [1.0 credit] (formerly 34.500)
Graduate Seminar in Religion
A seminar on theories and methods in the study of Religion. Compulsory for M.A. students.

RELI 5001 [0.5 credit] (formerly 34.501)
Directed Studies in Religion

RELI 5002 [0.5 credit] (formerly 34.502)
Directed Studies in Religion

RELI 5003 [1.0 credit] (formerly 34.503)
Tutorial
A tutorial preparing the student in the general
area of their thesis. Normally taken with the
thesis supervisor.

RELI 5403 [0.5 credit] (formerly 34.543)
The Anthropology of Signs and Symbols
Various theoretical and methodological
approaches to the anthropology of signs and
symbols, their internal workings, and their
relationship to other aspects of social life. (Also
listed as ANTH 5403.)
Prerequisite: Permission of the Department.

RELI 5909 [2.0 credits] (formerly 34.599)
M.A. Thesis

Applicants must have completed 1.0 credit in research methods in their undergraduate program. The School of Social Work will not normally grant advanced standing for course work completed prior to entry into the M.S.W. program. Students accepted into M.S.W. Year I will be expected to complete 5.0 credits of course work in Year I and 6.0 credits of course work in Year II. Students accepted into M.S.W. Year II will be expected to complete 6.0 credits of course work. Work experience may not be substituted for research or other academic requirements, including the practicum.

Candidates must apply by December I for September admission.

Part-Time Studies

The School offers part-time studies to a limited number of qualified candidates who cannot participate in a program of full-time study. The requirements for part-time studies are identical to those of the regular program, except that part-time students are limited to a maximum of 1.0 credit of course work per term.

Students registered on a part-time basis must maintain continuous registration for a minimum of two terms per year until all course requirements are completed.

In their first fall term, part-time students in the M.S.W. Year I must register in SOWK 5501 or SOWK 5502 and one of SOWK 5308, SOWK 5408, or SOWK 5608. Part-time students in the M.S.W. year II register in SOWK 5305 plus an additional 0.5 credit of course work in their first fall term.

Change of Status

Students contemplating changing their full-time or part-time status should consult the General Regulations section of this Calendar.

Program Requirements

Students with an Honours undergraduate degree other than a B.S.W. or the equivalent who are admitted into the two-year M.S.W. program must complete Year I and Year II.

Students with a B.S.W. or equivalent who are admitted into the one-year M.S.W. program must complete Year II.

Year I of the M.S.W. consists of the following 5.0 credits:

- SOWK 5308
- SOWK 5408
- SOWK 5608
- SOWK 5501
- SOWK 5502
- SOWK 5606

- 0.5 credit to be taken from graduate-level course offerings in the School.

Year II of the M.S.W. consists of the following 6.0 credits:

- SOWK 5305 (or SOWK 5306 and SOWK 5307)
- SOWK 5405 (or SOWK 5406 and SOWK 5407)

And any of the following options:

Thesis/Course Work Option
SOWK 5909

2.0 credits of course work

Thesis/Practicum Option
SOWK 5909

SOWK 5607

Research Essay/Course Work/Practicum Option
SOWK 5903

SOWK 5607

1.0 credit of graduate level course work in social work

or

SOWK 5904 (0.5credit)

SOWK 5607

1.5 Credits Graduate level course work in Social Work

Practicum/Course Work Option
SOWK 5607

2.0 credits of course work

For all course options listed above, a minimum of 1.0 credit must be taken from graduate-level course offerings, in the School of Social Work, a maximum of 1.0 credit may be taken outside the School of Social Work, and a maximum of 0.5 credit may be taken at the 4000-level.

All students in SOWK 5903, SOWK 5909, SOWK 5606, SOWK 5607 must maintain continuous registration until completion of the course in accordance with the General Regulations as stated in this calendar.

Students in the Master's Program before 1995

The program requirements established on admission for students who were registered in the two-year M.S.W. program prior to 1995 continue to apply; however, negotiation of course offerings to satisfy program requirements will be established on an individual basis. Completion of a practicum and either a Thesis or an Independent Inquiry Project (SOWK 5900) will continue to be required.

Academic Standing

Candidates for the M.S.W. degree must complete all course work (or the equivalent) counted towards the degree with a grade of B- or better. The School of Social Work does not permit the C+ option.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

Note: All seminar courses, directed studies, workshops, independent study courses, and community practice courses are governed by Section 7.7, Tutorials, of the General Regulations.

M.S.W. Year I - Required Courses

SOWK 5308 [0.5 credit] (formerly 52.538)
Direct Intervention
Presentation of a structural framework for social work theory and practice examining assessment and interventive approaches, analytical and interaction skills, helping process and social transformation. Explores interventions with individuals, families, small groups based on an understanding of class, gender, race, age, ability and sexual orientation.
Precludes additional credit for SOWK 5304.
Prerequisite: Registration in M.S.W. Year I.

SOWK 5408 [0.5 credit] (formerly 52.548)
Social Administration and Policy
Knowledge and skills required for understanding, analyzing and practicing social policy development and administration in social work. Political, economic, and social context of policymaking, theoretical perspectives for developing policy, and contemporary social policy issues.
Precludes additional credit for SOWK 5304.
Prerequisite: Registration in M.S.W. Year I.

SOWK 5501 [0.5 credit] (formerly 52.551)
Theories in Social Science and Social Work
Examines relationships between theories in social science and in social work exploring connections to social work practice and emphasizing theories of inequality.
Precludes additional credit for SOWK 5500.
Prerequisite: Registration in M.S.W. Year I.

SOWK 5502 [0.5 credit] (formerly 52.552)
History of Social Welfare and Social Work
Historical development of social welfare policies and the Canadian welfare state. History of relationship of economy, family, welfare institutions and Canadian state. Focus on the origins and development of social work as a profession.
Precludes additional credit for SOWK 5500.
Prerequisite: Registration in M.S.W. Year I.

PPP SOWK 5606 (2.0 credits) (formerly 52.566)
Practicum I
Integration of academic and practical aspects of social-work education. 500 hours of guided learning in a community-based setting. Field seminar required.
Prerequisite: Registration in M.S.W. Year I, and completion of or concurrent registration in SOWK 5308, SOWK 5408, SOWK 5501, SOWK 5502, and SOWK 5608.

SOWK 5608 [0.5 credit] (formerly 52.568)
Community Work
Models and methods of community organization. Social-economic contexts and ideological approaches to social change work; social change efforts; globalization and corporate rule.

M.S.W. Year II - Required Courses and Program Options

SOWK 5305 (formerly 52.535)
Advanced Theory for Social Work Practice
Advanced theory of the intersection of practice in direct intervention, community work, and social administration and policy, from a perspective of a range of structural inequalities.
Prerequisite: Registration in M.S.W. Year II.

SOWK 5306 [0.5 credit] (formerly 52.536)
Advanced Theory for Social Work Practice
First half of SOWK 5305.
Prerequisite: Registration in M.S.W. Year II.

SOWK 5307 (formerly 52.537)
Advanced Theory for Social Work Practice
Second half of SOWK 5305.
Prerequisite: Registration in M.S.W. Year II.

SOWK 5405 (formerly 52.545)
Research and Evaluation in Social Work
Addresses the logic of inquiry, and assesses quantitative and qualitative techniques. Attention to program and direct intervention evaluation especially with the use of action and participatory research approaches. May include research or evaluation project with community agencies and practitioners, or individual research proposal.
Prerequisite: Registration in M.S.W. Year II.

SOWK 5406 [0.5 credit] (formerly 52.546)
Research and Evaluation in Social Work
First half of SOWK 5405.
Prerequisite: Registration in M.S.W. Year II.

SOWK 5407 [0.5 credit] (formerly 52.547)
Research and Evaluation in Social Work
Second half of SOWK 5405.
Prerequisite: Social Work SOWK 5406.

SOWK 5409 [0.5 credit] (formerly 52.549)
Social Administration and Policy
Second half of SOWK 5400.
Prerequisite: Registration in M.S.W. Year II.

SOWK 5600 [2.0 credits] (formerly 52.560)
Practicum II
500 hours integrating advanced social work theories and practice. Students are expected to build on and to develop beyond present knowledge and skills. Field seminar required. Not usually available in the first term of registration.
Prerequisites: Initial registration in the M.S.W. program in either 1995-96 or 1996-97.

SOWK 5607 [2.0 credits] (formerly 52.567)
Practicum II
500 hours integrating advanced social work theories and practice. Field seminar required. Not usually available in the first term of registration.
Prerequisite: B.S.W. or completion of M.S.W. Year I, and completion or concurrent registration in SOWK 5305.

SOWK 5909 [2.0 credits] (formerly 52.599)
Thesis
Prerequisite: Registration in M.S.W. Year II.

Optional Courses

SOWK 5006 [0.5 credit] (formerly 52.506)
Social Work, Gender and the State
This seminar course examines the construction of the "social" sphere and making the "social" work as it applies to the development of social welfare and the social work profession. An analysis of the gendered character of state provisions, women's participation in their formation, and their implications with regard to race and class is used to examine the current restructuring of social welfare.

SOWK 5101 [0.5 credit] (formerly 52.511)
Social Policy Analysis
Conceptual, theoretical, and empirical tools for the analysis of social policies in Canadian society.

SOWK 5102 [0.5 credit] (formerly 52.512)
Political Economy of Health
Distinctions and connections between health and health care. Who receives care, who provides it, who pays for it, and who makes the decisions affecting it.

SOWK 5105 [0.5 credit] (formerly 52.515)
Poverty and Income Security
Examination of theories of poverty and wealth, conflicting understandings of poverty and the unequal distribution of income and wealth in Canada. Theories of poverty and wealth as they influence social policy, notably universal programs, social welfare services, income redistribution, and taxation.

SOWK 5106 [0.5 credit] (formerly 52.516)
Women and Social Policy
Structural analysis of social policy affecting women. Relationship of feminist scholarship to the practical work of developing policy and to policy outcomes for women. Impact of the women's movement on the formal processes of policy making.

SOWK 5108 [0.5 credit] (formerly 52.518)
Seminar in Social Policy
Social policy analysis of particular fields such as corrections, mental health services, children's services, or health care services. Current programs, historical developments, and the major current issues, developments, and challenges.

SOWK 5207 [0.5 credit] (formerly 52.527)
Community Economic Development
Critical understandings of sustainable Community Economic Development (CED). Diverse local and international CED initiatives. Skills necessary for facilitating CED processes.

SOWK 5301 [0.5 credit] (formerly 52.531)
Women, Male Violence and Social Change
Focus on male violence against women. Theory, responses of the state and the justice system, and practice approaches to helping women and the men who abuse them, as well as initiatives for social change.

SOWK 5302 [0.5 credit] (formerly 52.532)
Mental Health Policy and Practice
Historical development, legislative framework, institutional and service structure, and practice issues related to mental health services in Canada. The interface between mental health and sexual abuse, family violence, racism, corrections, aging and immigration.

SOWK 5309 [0.5 credit] (formerly 52.539)
Foundations of Direct Intervention
Philosophical and historical evolution of the competing paradigms underlying contemporary social work practice, with individuals, families, and community analyzed using philosophy of science and the sociology of knowledge.

SOWK 5503 [1.0 credit] (formerly 52.553)
Directed Studies - Group
Exploration of selected theoretical perspectives relevant for social work practice that are offered subject to the availability of faculty. Arranged for small groups of students who are interested in a similar substantive area.

SOWK 5504 [1.0 credit] (formerly 52.554)
Directed Studies - Individual
Individual exploration of selected theoretical perspectives for social work practice under the direct supervision of a member of faculty or visiting scholar.

SOWK 5505 [0.5 credit] (formerly 52.555)
Directed Studies - Group
Exploration of selected theoretical perspectives relevant for social work practice that are offered subject to the availability of faculty. Arranged for small groups of students who are interested in a similar substantive area.

SOWK 5506 [0.5 credit] (formerly 52.556)
Directed Studies - Individual
Individual exploration of selected theoretical perspectives for social work practice under the direct supervision of a member of faculty or visiting scholar.

SOWK 5507 [0.5 credit] (formerly 52.557)
Workshop on Selected Topics in Social Work Practice
Approved workshops organized in the School and in the community may be offered subject to the availability of faculty. Evaluation of students is based on the student's role in the workshop and the nature of the assignment(s) required of the student.

SOWK 5508 [1.0 credit] (formerly 52.558)
Studies in Social Work
May combine directed studies - group or individual - workshops, research study, or community practice. Registration is by permission of the supervisor of graduate studies and will be granted only when the student has negotiated an approved study agreement with the social work instructor(s).

SOWK 5509 [0.5 credit] (formerly 52.559)
Studies in Social Work
May combine directed studies - group or individual - workshops, research study, or community practice. Registration is by permission of the supervisor of graduate studies and is granted only when the student has negotiated an approved study agreement with the social work instructor(s).

SOWK 5609 [0.5 credit] (formerly 52.569)
Studies in Community Practice
May be offered subject to the availability of faculty. Studies are supervised by faculty. A written proposal is required that must include learning objectives, practice objectives, time of completion, and criteria and method of evaluation.

SOWK 5700 [0.5 credit] (formerly 52.570)
Special Topics in Social Work
The School will offer lecture courses on substantive topics related to social work and social welfare. Topics will vary each year depending on the interests of faculty and students. Students from outside the School of Social Work may register with permission of the School.

SOWK 5701 [0.5 credit] (formerly 52.571)
Special Topics in Social Work
The School will offer lecture courses on substantive topics related to social work and social welfare. Topics will vary each year depending on the interests of faculty and students. Students from outside the School of Social Work may register with permission of the School.

SOWK 5702 [0.5 credit] (formerly 52.572)
Special Topics in Social Work
The School will offer lecture courses on substantive topics related to social work and social welfare. Topics will vary each year depending on the interests of faculty and students. Students from outside the School of Social Work may register with permission of the School.

SOWK 5703 [0.5 credit] (formerly 52.573)
Special Topics in Social Work
The School will offer lecture courses on substantive topics related to social work and social welfare. Topics will vary each year depending on the interests of faculty and students. Students from outside the School of Social Work may register with permission of the School.

SOWK 5704 [0.5 credit] (formerly 52.574)
Race, Culture and Social Work Practice
Anti-racist framework for social work practice to analyze policy and practice issues. "Privilege" as a critical and essential component for understanding oppression based on race and culture. Complex intersections of race and culture with class, gender, age, and other dimensions.

SOWK 5705 [0.5 credit] (formerly 52.575)
Child Protection Policies and Interventions
Explores child welfare policy and the organization of social work practice particularly in the Canadian context. A range of welfare provisions affecting children and families will be considered as will direct child protection policies.

SOWK 5801 [0.5 credit] (formerly 52.581)
Social Work Practice Seminar: Feminist Social Work Practice with Individuals, Couples, and Families
Theory and practice of feminist approaches to social work with individuals, couples and families. Issues of diversity, such as race and class, as well as gender. Problem-based learning approach.

SOWK 5802 [0.5 credit] (formerly 52.582)
Social Work Practice Seminar: Cross-cultural Studies of the Self and Related Subjects
Governance and care of the Self in different cultural and historical contexts. Theoretically located in emergent sociology and psychology of governance and care of the self. Cross-cultural perspectives practices and policies of different forms of governance and debates about social regulation.

SOWK 5804 [0.5 credit] (formerly 52.584)
Social Work Practice Seminar: Organizing for Social Change
Hands-on introduction to theories, models, and methods of organizing for social change from grass roots groups to national coalitions. Practical skills for helping people mobilize to influence relevant social issues. Problem-based learning approach.

SOWK 5805 [0.5 credit] (formerly 52.585)
Social Work Practice Seminar: Social Development in the International Context
International social development policies and practices from a cross-cultural perspective. Focus on international social policies and practices, and on economic, health, telecommunication, migration, and education policies and practices.

SOWK 5803 [0.5 credit] (formerly 52.583)
Social Work Practice Seminar
Applied knowledge for social work practice utilizing "problem-based learning". Examples drawn from the experience of social work practitioners. Self-guided individual and group study, directed by a faculty tutor.

SOWK 5806 [0.5 credit] (formerly 52.586)
Social Work Practice Seminar
Applied knowledge for social work practice utilizing "problem-based learning". Examples drawn from the experience of social work practitioners. Self-guided individual and group study, directed by a faculty tutor.

SOWK 5807 [0.5 credit] (formerly 52.587)
Social Work Practice Seminar
Applied knowledge for social work practice utilizing "problem-based learning". Examples drawn from the experience of social work practitioners. Self-guided individual and group study, directed by a faculty tutor.

SOWK 5808 [0.5 credit] (formerly 52.588)
Social Work Practice Seminar
Applied knowledge for social work practice utilizing "problem-based learning". Examples drawn from the experience of social work practitioners. Self-guided individual and group study, directed by a faculty tutor.

SOWK 5809 [0.5 credit] (formerly 52.589)
Social Work Practice Seminar
Applied knowledge for social work practice utilizing "problem-based learning". Examples drawn from the experience of social work practitioners. Self-guided individual and group study, directed by a faculty tutor.

SOWK 5900 [1.0 credit] (formerly 52.590)
Independent Inquiry Project
This course is available only for those students registered in the previous two-year program.

(See *1993-94* Graduate Calendar or consult the School for description).

SOWK 5903 [1.0 credit] (formerly 52.593)
Independent Research Studies in Social Work
Individually-arranged independent research study. Requires a written proposal that outlines a research project with clear learning objectives, and practice objectives (where relevant).

SOWK 5904 [0.5 credit] (formerly 52.594)
Independent Research Studies in Social Work
Individually-arranged independent research study. Requires a written proposal that outlines a research project with clear learning objectives, and practice objectives (where relevant).

SOWK 5909 (formerly 52.599)
Thesis
Prerequisite: Registration in MSW Year II.

Sociology and Anthropology

Loeb Building B742
Telephone: (613) 520-2582
Fax: (613) 520-4062
Web site: www.carleton.ca/socanth/

The Department

Chair of the Department, C. Gordon

Coordinator of Graduate Programs in Sociology, D. Forcese

Coordinator of the Graduate Program in Anthropology, J. Chevalier

The Department of Sociology and Anthropology offers programs of advanced study and research leading to the M.A. and the Ph.D. degrees in Sociology, and the M.A. in Anthropology.

The principal focus of the graduate programs in sociology is the organization and development of contemporary societies in comparative context and with particular reference to Canadian society. Specializations in theory and methodology, social stratification and power, cultural and gender studies, and in comparative institutions are offered.

The anthropology program focuses on the social and cultural other, including its popular and scholarly representations, through current emphasis on three program concentrations:

- the anthropology of signs and symbols
- North American native studies
- the anthropology of development and underdevelopment.

The department strives to achieve a blend of research and formal graduate instruction in its graduate programs.

Qualifying-Year Program

Applicants with general (3-year) bachelor's degrees may be admitted into a qualifying-year program designed to raise their standing to honours status. Students earning at least high honours standing in their qualifying-year courses will be considered for admission into the master's program.

Refer to the General Regulations section of this Calendar for details of the regulations governing the qualifying year.

Master of Arts in Sociology

Admission Requirements

The requirement for admission into the master's program is a B.A.(Honours) (or the equivalent) with at least high honours standing. Where relevant, previous professional experience will be taken into account in determining an applicant's standing on admission.

The deadlines for submitting applications and supporting documents for graduate study in sociology are as follows: February 1 for students requesting financial assistance; July 1 for students not requesting financial assistance but who are seeking admission in September; and November 1 for students who are seeking admission in January.

Program Requirements

Master's students in sociology are required to select and follow one of the optional program patterns below, chosen in consultation with a graduate adviser:

Thesis Program

- 3.0 credits. Under certain circumstances one of the courses may be selected from those offered at the senior undergraduate level. SOCI 5005 and SOCI 5809 are highly recommended, especially for students who at the time of registration have not decided on a thesis topic
- A thesis equivalent to 2.0 credits
- An oral examination on the candidate's thesis and program

Research Essay Program

- 4.0 credits. Under certain circumstances one of the courses may be selected from those offered at the senior undergraduate level. SOCI 5809, is highly recommended, especially for students who at the time of initial registration have not decided on a research topic
- A research essay equivalent to 1.0 credit
- An oral examination on the candidate's research essay and program

Course Work Program

- 5.0 credits excluding SOCI 5905. Under certain circumstances one of the courses may be selected from those offered at the senior undergraduate level
- Written and oral comprehensive examination in the candidate's area of specialization and program

Concentration in Quantitative Methodology

Students in either the research essay or thesis program options may pursue a concentration in quantitative methodology. For a concentration in quantitative methodology courses selected must include the following:

- SOCI 5005

- SOCI 5809

- At least 1.0 credit selected from: SOCI 5101; SOCI 5102; SOCI 5103; SOCI 5104; SOCI 5105; SOCI 5201; SOCI 5605

- At least 1.0 credit in sociology at the graduate level (not including those listed above)

Students in the Concentration in Quantitative Methodology may apply for admission into a Cooperative Education option. This option provides an opportunity for students to enhance their educational experience through a work placement directly related to their area of interest and expertise. Once admitted into this option, students shall enrol in SOCI 5907. The conditions of the placement are arranged with the student's supervisor and the graduate coordinator. Grades for the cooperative education placement are assigned in consultation between the placement supervisor and the graduate coordinator. Placements can be held for up to two academic terms and count for 1.0 credit.

Transfer from Thesis to Course Work M.A.

Students who choose to change from the thesis to the course work program must normally do so before registering for a third term after initial, full-time registration, or before registering for a fifth term after initial part-time registration.

Academic Standing

A grade of B- or better must normally be obtained in each credit counted toward the master's degree. With the recommendation of the department, and permission of the Dean of the Faculty of Graduate Studies and Research, a candidate may be allowed a grade of C+ in 1.0 credit.

Master of Arts in Anthropology

Admission Requirements

The requirement for admission into the master's program is a B.A.(Honours) (or the equivalent) with at least high honours standing. Where relevant, previous professional experience will be taken into account in determining an applicant's standing on admission.

The deadlines for submitting applications and supporting documents for graduate study in anthropology are as follows: February 1 for students requesting financial assistance; July 1 for students not requesting financial assistance but who are seeking admission in September; and November 1 for students who are seeking admission in January.

Program Requirements

Master's students in anthropology are required to select and follow one of the optional program patterns below, chosen in consultation with a graduate adviser:

Thesis Program

- 3.0 credits to include:

    ANTH 5401 (normally to be taken in the first fall term after admission to the program);

    ANTH 5402;

    2.0 additional credits selected from the anthropology graduate course offerings; from courses offered in the sociology graduate program (especially in theory and methods, or in areas which relate to the student's thesis research interests); from 4000-level courses offered in the sociology and anthropology undergraduate program (with permission of the graduate committee); or any combination of these selected in consultation with the student's graduate adviser. Courses in other programs in the University may also be selected, especially if they relate to the student's proposed thesis research, but normally not in excess of 1.0 credit;

- A thesis equivalent to 2.0 credits;

- An oral examination on the candidate's thesis and program.

Course Work Program

5.0 credits excluding ANTH 5905, consisting of:

    ANTH 5401 (normally to be taken in the first fall term after admission to the program);

    ANTH 5402;

    4.0 additional credits as described in the thesis program above, chosen in consultation with the student's graduate adviser;

- A written and oral comprehensive examination in the candidate's area of specialization and program.

Transfer from Thesis to Course Work M.A.

Students who choose to change from the thesis to the course work program must normally do so before registering for a third term after initial, full-time registration, or before registering for a fifth term after initial part-time registration.

Academic Standing

A grade of B- or better must normally be obtained in each credit counted toward the master's degree. With the recommendation of the department, and permission of the Dean of the Faculty of Graduate Studies and Research, a candidate may be allowed a grade of C+ in 1.0 credit or each of two 0.5 credits.

Doctor of Philosophy in Sociology

The substantive focus of the Ph.D. program is the organization and development of contemporary societies, both in a comparative context and with particular reference to Canadian society.

The Ph.D. program in sociology normally will be undertaken on a full-time basis; however in exceptional cases the department will consider admission on a part-time basis.

Admission Requirements

The minimum requirement for admission into the Ph.D. program is a master's degree (or the equivalent) in sociology, normally with a minimum average of B+ in courses (including the thesis where applicable), and with no grade below B.

Applicants who have deficiencies in certain areas may be admitted to the Ph.D. program, but will normally be required to complete additional course work.

The deadlines for submitting applications and supporting documents for admission into the Ph.D. program in sociology are as follows: February 1 for students requesting financial assistance; July 1 for students not requesting financial assistance but who are seeking admission in September; and November 1 for students who are seeking admission in January.

Program Requirements

The specific program requirements of the Department of Sociology and Anthropology are the following:

- 10.0 credits including SOCI 6000, and a thesis equivalent to a maximum of 7.0 credits or a minimum of 5.0 credits;
- Written and oral comprehensive examinations in two areas of specialization;
- Presentation of a thesis proposal;
- Language requirements as stated below ;
- An oral defence of the thesis.

Comprehensive Examinations

Each Ph.D. candidate is required to write comprehensive examinations in two of the following areas:

- Theory and Methodology
- Stratification and Power
- Cultural Studies
- Applied Social Research

At least one but not both of the examinations must be in the area of stratification and power.

Subjects of instruction and research subsumed under these four areas are:

Theory and Methodology

- Logic of Social Scientific Inquiry
- Classical Social Theories
- Contemporary Social Theories
- Feminist Theories
- Research Methods (Historical, Qualitative, and Quantitative)

Stratification and Power

- Occupations, Organizations, and the Labour Process
- Class Analysis and Social Stratification
- Political Sociology
- Race and Ethnic Relations
- Gender Relations
- Political Economy
- Canadian Society
- Social and Economic Development
- Citizenship Studies
- Governance, Regulation, and Law

Cultural Studies

- Communication and Popular Cultures
- Ethnographic Analysis
- Discourse Analysis
- Social Anthropology
- Social and Virtual Spaces

Applied Social Research

- Criminal Justice
- Health and Illness Policy
- Population Studies
- Sociology of Language
- Built Environments
- Education Policy

Upon petition to the sociology graduate program's coordinator, an approved field in sociology or a related discipline may be substituted for one of the options above. The

subjects of instruction and research subsumed under each of the areas are indicative, and may be subsumed under more than one area, depending on the analytic approach adopted.

The comprehensive examinations are to be completed after course requirements for the Ph.D. have been completed. Normally comprehensive examinations must be completed no later than two years or six terms after initial full-time registration, and four years or twelve terms after initial part-time registration.

The thesis proposal is to be presented after comprehensive requirements have been completed. Normally the thesis proposal must be presented no later than two and one-half years or seven terms after initial full-time registration and five years or fifteen terms after initial part-time registration.

Language Requirement

The Department of Sociology and Anthropology requires each Ph.D. candidate to demonstrate an understanding of a language other than English. Although French is the preferred second language, students may be permitted to substitute another language if it is demonstrably relevant to their professional interests. It is strongly advised, however, that all English-speaking candidates be proficient in French. The language requirements may be satisfied by a demonstration of reasonable understanding, on sight, of material contained in selected samples of sociological literature in that language. Students may find it necessary or advisable to take a course in the required language before undertaking the departmental language examination.

Academic Standing

Candidates must obtain a grade of B- or better in each credit, and Satisfactory on the comprehensive examinations, the Ph.D. thesis and its oral defence.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/ programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

SOCI 5000 [0.5 credit] (formerly 53.500)
Classical Sociological Theory
Crucial sociological concepts and ideas by the founders of sociology. Attention will be given to Marx, Weber, Durkheim, Pareto, Comte, and Husserl.

SOCI 5001 [0.5 credit] (formerly 53.501)
Selected Topics in Classical Theory
Topic varies from year to year.
Students should check with the Department regarding the topic offered.

SOCI 5002 [0.5 credit] (formerly 53.502)
Contemporary Sociological Theory
Major theoretical perspectives in sociology, including social behaviourism; social action theories such as symbolic interactionism, phenomenological sociology, ethnomethodology; and structuralist theories such as structural functionalism, neo-Marxism and critical theory.

SOCI 5003 [0.5 credit] (formerly 53.503)
Selected Topics in Contemporary Theory
Topic varies from year to year. Students should check with the Department regarding the topic offered.

ANTH 5004 [0.5 credit] (formerly 54.504)
Ecological Anthropology
Anthropological approaches to the study of human environment relationships and to current problems of ecological degradation affecting native societies around the world.

SOCI 5005 [0.5 credit] (formerly 53.505)
Recurring Debates in Social Thought
Recurring issues and debates in the discipline. Topics such as the nature of social science; the objective world versus social construction; questions of evidence, meaning and measurement; agency versus structure; the relation between research and praxis; knowledge and power, may be considered.
Prerequisite: The course is restricted to M.A. students in sociology. Others may be admitted by permission of the Department.

SOCI 5007 [0.5 credit] (formerly 53.507)
Social Change and Economic Development
Critical examination of studies of change and development in historical and contemporary national and transnational systems.

SOCI 5009 [0.5 credit] (formerly 53.509)
Philosophy of Social Science I
Philosophy of language and the basic elements of scientific method, such as the classification of the sciences, the concepts of value, cause and probability, induction and deduction, confirmation of hypotheses, and the concept of truth.

SOCI 5101 [1.0 credit] (formerly 53.511)
Research Design and Data Analysis
An integrated approach to the problems involved in the analysis of quantitative data, research design and procedures.

SOCI 5102 [0.5 credit] (formerly 53.512)
Statistical Methods I
A course on multiple regression analysis, with a review of basic statistical assumptions and techniques, followed by a detailed discussion of multiple regression analysis as a statistical technique.

SOCI 5103 [0.5 credit] (formerly 53.513)
Statistical Methods II
The focus will be advanced research methods. Topics will include distributions, sampling distributions, hypothesis testing, and non-parametric methods. There will be an introduction to multivariate techniques, including regression and loglinear models.

SOCI 5104 [0.5 credit] (formerly 53.514)
Multivariate Analysis
This course provides advanced instruction in methods and statistics. Consideration will be given to multiple regression, factor analysis, canonical analysis.

SOCI 5105 [0.5 credit] (formerly 53.515)
Selected Topics in Social Research
Topic varies from year to year. Students should check with the Department regarding the topic offered.

ANTH 5106 [0.5 credit] (formerly 54.516)
North American Native Studies
An examination of selected issues in Canadian Indian, Inuit, and Métis history. The course will explore debates over social change, cultural autonomy, native rights, and government policy.

ANTH 5107 [0.5 credit] (formerly 54.517)
Problems in North American Ethnohistory
Methodological and substantive problems in the history of Canadian native peoples. Controversies concerning the impact of European penetration and colonial policies on inter-tribal relations, cultural identity, and other aspects of native life will be explored.

ANTH 5109 [0.5 credit] (formerly 54.519)
Development, Dependency and Gender
Varieties of "development" and "dependency" theories, and feminist critiques of both, in analyzing gender relations in the Third and Fourth Worlds.

SOCI 5200 [0.5 credit] (formerly 53.520)
Comparative Social Systems
Perspectives and research procedures employed by sociologists in the systematic and explicit comparison of data from two or more societies.

SOCI 5201 [0.5 credit] (formerly 53.521)
Comparative Methods in Social Research
Current analytical problems and applications of comparative methods in social research.

Students are expected to participate in a group research project in which one or more of these methods will be applied.

ANTH 5202 [0.5 credit] (formerly 54.522)
The Anthropology of Underdevelopment
Analysis of theoretical and historically concrete issues in the study of variable economic systems ranging from domestic subsistence and peasant production to slavery and capital-dominated markets.

SOCI 5204 [0.5 credit] (formerly 53.524)
Consuming Passions: The Regulation of Consumption, Appearance and Sexuality
Examination of the rise of consumption and private pleasures and their regulation and self-regulation. (Also listed as LAWS 5008.)

SOCI 5205 [1.0 credit] (formerly 53.525)
Canadian Society
A critical examination of sociological models of modern societies and their relevance to Canada.

SOCI 5206 [0.5 credit] (formerly 53.526)
Sociology of Occupations and Professions
A consideration of the development of occupational recruitment patterns and manpower problems in developed and developing areas.

SOCI 5207 [0.5 credit] (formerly 53.527)
Sociology of Formal Organizations
A consideration of the forms and processes of bureaucracy in modern society, government and industry.

SOCI 5209 [0.5 credit] (formerly 53.529)
Sociology of Science and Technology
Study of the interaction among science, technology and change in modern societies.

SOCI 5300 [0.5 credit] (formerly 53.530)
Social Institutions I
Topic varies from year to year.
Students should check with the Department regarding the topic offered.

SOCI 5301 [0.5 credit] (formerly 53.531)
Social Institutions II
Topic varies from year to year.
Students should check with the Department regarding the topic offered.

SOCI 5302 [0.5 credit] (formerly 53.532)
The Labour Process
A consideration of the organization of work and production from feudal times to the present. The purpose of the course is to analyze the labour process in advanced capitalist societies by means of the historical comparative method.

SOCI 5303 [0.5 credit] (formerly 53.533)
Sociology of Education
The relations between education and other social institutions, the structure of educational opportunity, educational systems and organizations, and the sociology of learning.

SOCI 5306 [0.5 credit] (formerly 53.536)
Cultural Studies
The relations between cultural practices and other social practices in definite social formations. Discussions are grounded through the choice of specific Canadian research on topics such as media, art, music, education, pedagogy, etc.

SOCI 5307 [0.5 credit] (formerly 53.537)
Psychoanalysis and Cultural Studies
This course will examine the relationship between psychoanalytic and sociological theory. A particular focus will be on the work of feminist theorists.

ANTH 5308/SOCI 5308 [0.5 credit] (formerly 54.538/53.538)
Feminist Analyses
This course surveys topics of current theory and research in recent feminist analysis. Both anthropological and sociological literature will be used.

SOCI 5309 [0.5 credit] (formerly 53.539)
Cultural Theory
A survey of developments in European and North American Marxist and Post-Marxist cultural theories of the past quarter century.

SOCI 5400 [0.5 credit] (formerly 53.540)
Political Sociology
An examination of theoretical and empirical work on selected aspects of the state, politics and political behaviour, primarily in North America and Europe.

ANTH 5401 [0.5 credit] (formerly 54.541)
Proseminar in Anthropology I
Anthropology as it is currently practiced at Carleton University, with a special emphasis on the anthropology of signs and symbols, North American native studies, development and underdevelopment. Required of all students during the first fall term they are in residence.

ANTH 5402 [0.5 credit] (formerly 54.542)
Proseminar in Anthropology II
Issues in the design and conduct of anthropological inquiry especially concerning proposed thesis research such as analysis of ethnographic material and development of explanatory frameworks prevailing in the discipline.
Prerequisite: Completion of ANTH 5401 or permission of the Department.

ANTH 5403 [0.5 credit] (formerly 54.543)
The Anthropology of Signs and Symbols
Various theoretical and methodological approaches to the anthropology of signs and symbols, their internal workings, and their relationship to other aspects of social life. (Also listed as RELI 5403.)

SOCI 5404 [0.5 credit] (formerly 53.544)
Race, Ethnicity and Class in Contemporary Societies
Various theoretical approaches concerning the persistence and re-emergence of ethnic and/or racial groups are examined. Particular emphasis is given to the intersection and overlap of ethnicity and race with social class.

SOCI 5405 [0.5 credit] (formerly 53.545)
Power and Stratification
An examination of theories of elite behaviour, social class, and ideology.

ANTH 5408 [0.5 credit] (formerly 54.548)
SOCI 5408 [0.5 credit] (formerly 53.548)
Feminism and Materialism
An examination of recent attempts to develop feminist materialist theory and analyses. Substantive areas may include: the gender division of labour; family and economy; gender and class; gender, race and ethnicity; sexuality; reproduction; theory and politics.

SOCI 5409 [0.5 credit] (formerly 53.549)
The Politics of Social Movements and the State
Origins, ideologies, strategies and political implications of social and popular movements in North America and Western Europe. Attention is given to the peace, feminist, gay, ecology, and anti-racist movements, as well as to the emergence of the New Right.

SOCI 5500 [0.5 credit] (formerly 53.550)
Gender Formation and State Formation
The role of states in the formation of gender relations, in the context of class and race, and the production of gender as an aspect of state formation. The various levels of the state are conceived as both a site and object of gender politics.

SOCI 5504 [0.5 credit] (formerly 53.554)
Selected Problems in Political Economy I
A selected topic from current research in political economy. As the topic varies from year to year, students should check with the Department regarding the current offering. (Also listed as PECO 5501 and PSCI 5501.)

SOCI 5505 [0.5 credit] (formerly 53.555)
Selected Problems in Political Economy II
A selected topic from current research in political economy. As the topic varies from year to year, students should check with the Department regarding the current offering. (Also listed as PECO 5502 and PSCI 5502.)

SOCI 5600 [0.5 credit] (formerly 53.560)
Critical Discourse Analysis
Examination of the relations between discourse, social semiotics, extradiscursive semiotics and social organization.

SOCI 5605 [0.5 credit] (formerly 53.565)
Demographic Analysis
Intensive study of analytical strategies and techniques employed in demographic research. Attention is also given to mathematical and statistical models used in demography, which are relevant to research in other areas of sociology.

SOCI 5606 [0.5 credit] (formerly 53.566)
Selected Topics in Sociology
Topic varies from year to year.
Students should check with the Department regarding the topic offered.

SOCI 5607 [0.5 credit] (formerly 53.567)
Contemporary Theories of Crime and Social Regulation
Recent developments in theories of criminality and social regulation. Particular reference will be made to the regulatory mechanisms of both public and private spheres within legal institutions, corrections, economic institutions, and the family.

SOCI 5608 [0.5 credit] (formerly 53.568)
Women and Work
Issues concerning women and work, such as housework, occupational segregation, part-time work, the changing economic structure of work, wage inequality, and state policies with respect to childcare, equal pay and work of equal value, and affirmative action.

SOCI 5707 [0.5 credit] (formerly 53.577)
Crime, Social Control and Social Change
An examination of the role of the discourses and ideologies surrounding crime, criminal processes, and social change. Topics may include such issues as juvenile justice, victimization, corporate crime, criminalization of indigenous peoples, substance use and abuse.

SOCI 5802 [0.5 credit] (formerly 53.582)
Departmental Seminar
Topic varies from year to year. Students should check with the Department regarding the topic offered.

SOCI 5803 [0.5 credit] (formerly 53.583)
Critical Theory
Recent developments in critical theory based upon its initial formulation by the Frankfurt School, with emphasis upon particular contemporary theories in a given year, e.g., J. Habermas, H. Willems, etc.

SOCI 5804 [0.5 credit] (formerly 53.584)
Modern Marxist Theory
An examination of topics of theory and research in modern Marxist literature; the central focus is on problems of class analysis, the state, and politics in advanced capitalist societies.

SOCI 5805 [0.5 credit] (formerly 53.585)
Selected Topics in Sociology
Topic varies from year to year. Students should check with the Department regarding the topic offered.

SOCI 5806 [0.5 credit] (formerly 53.586)
Selected Topics in Sociology
Topic varies from year to year. Students should check with the Department regarding the topic offered.

ANTH 5807 [0.5 credit] (formerly 54.587)
Selected Topics in the Anthropology of Signs and Symbols
Topic varies from year to year. Students should check with the Department regarding the topic offered.

ANTH 5808 [0.5 credit] (formerly 54.588)
Selected Topics in North American Native Studies
Topic varies from year to year. Students should check with the Department regarding the topic offered.

SOCI 5809 [0.5 credit] (formerly 53.589)
The Logic of the Research Process
An examination of the research process, including the phases of conceptualization, choice of indicators, sampling, data collection, and analysis. Published articles will be studied as exemplars of the range of possible research strategies.

ANTH 5809 [0.5 credit] (formerly 54.589)
Selected Topics in the Anthropology of Development and Underdevelopment
Topic varies from year to year. Students should check with the Department regarding the topic offered.

SOCI 5900 [0.5 credit] (formerly 53.590)
Tutorial

ANTH 5900 [0.5 credit] (formerly 54.590)
Tutorial

SOCI 5905 [2.0 credits] (formerly 53.595)
Course Work Comprehensive in Sociology
Available for students in a course work M.A. who by the third term in their M.A. program have not yet completed their written and oral examinations. Completion of this course does not reduce the formal requirement of 5.0 credits.

ANTH 5905 [2.0 credits] (formerly 54.595)
Course Work Comprehensive in Anthropology
Available for students in a course work M.A. who by the third term in their M.A. program have not yet completed their written and oral examinations. Completion of this course does not reduce the formal requirement of 5.0 credits.

ANTH 5906 [0.5 credit] (formerly 54.596)
Field Seminar
This course is concerned with the conduct of directed field research, by special arrangement (for individuals or groups), to be combined with readings and papers under the supervision of a faculty member. The course may normally be taken only once in a student's program.

SOCI 5907 [0.5 credit] (formerly 53.597)
Placement in Sociology
This course is required for students in the Concentration in Quantitative Methodology who have been admitted into the Cooperative Education option. This option provides an opportunity to enhance educational experience through work placement.

ANTH 5907 [0.5 credit] (formerly 54.597)
Placement in Anthropology
This course offers an opportunity to earn academic credit by engaging in research activities under the supervision of professional researchers in museums, government departments, non-governmental organizations, or other professional research settings. Placement research must be related to the preparation of the master's thesis.

SOCI 5908 [1.0 credit] (formerly 53.598)
M.A. Research Essay
Students may enrol in this course for a maximum of three consecutive terms of study, including one summer term. Students must enrol in this course not later than the beginning of the second full year of study.

SOCI 5909 [2.0 credits] (formerly 53.599)
M.A. Thesis

ANTH 5909 [2.0 credits] (formerly 54.599)
M.A. Thesis

SOCI 6000 [1.0 credit] (formerly 53.600)
Doctoral Seminar
An in-depth study of current research in sociology, including an inquiry into research techniques, conceptualization and attendant theoretical issues. This course is required of all first-year doctoral students in sociology.

SOCI 6001 [0.5 credit] (formerly 53.601)
Selected Topics in Sociology
Topic varies from year to year.
Students should check with the Department regarding the topic offered.

SOCI 6900 [0.5 credit] (formerly 53.690)
Tutorial

SOCI 6909 [7.0 credits] (formerly 53.699)
Ph.D. Thesis

Systems and Computer Engineering

Mackenzie Building 4456
Telephone: (613) 520-5740
Fax: (613) 520-5727
Email: gradinfo@sce.carleton.ca
Web site: www.sce.carleton.ca

The Department

Chair of the Department, R.A. Goubran

Associate Chair for Graduate Studies,
S. Majumdar

Director, Telecommunications Technology Management Program, A.J. Bailetti

In addition to University and Graduate Faculty regulations, all Engineering departments share common procedures that are described in Section 18 of the General Regulations section of this Calendar.

The Department of Systems and Computer Engineering has a large and active graduate program. We offer five graduate programs of study:

- M.A.Sc. in Electrical Engineering

- M.Eng. in Electrical Engineering

- M.Eng. in Telecommunications Technology Management

- M.Sc. in Information and Systems Science

- Ph.D. in Electrical Engineering.

In addition, certain faculty members in the department are members of the Ottawa-Carleton Institute for Computer Science, which offers a program leading to the M.C.S. degree. This program is more fully described in the Institute's section of this Calendar.

The programs are described in more detail below.

Fields of Research and Study

Research in the Department centres upon the analysis and design of engineering systems which process and transmit information and have computers as components. Within this context, several interrelated areas of study receive major attention:

Communication Systems
- Broadband, ATM, and Multimedia Networks

- Wireless Data Networks

- Portable and Mobile Communication Systems

- Signal Processing

- Network Management

- Software Methods

- Coding and Information Theory

Computer Systems
- CAD/CASE of Software and Systems

- Real-Time and Distributed Computing

- Software Engineering

- Object-Oriented Systems

- Design and Management of Distributed Application Systems

- Computer Resource Management

- Modeling of Client-Server Systems

- Data Base Systems

- Knowledge-based Systems

- Image Processing Systems

- Signal Processing Systems

- Robotic Systems

- Control Systems

Analysis Techniques
- Modeling and Simulation

- Performance Analysis

- Optimization

Management of Engineering Processes
- Management of Design Systems

- Software Project Management

- Business and Technology Opportunities

- Integrated Product Development

Course work provides students with the fundamental material and allows specialization in one or more of the above areas as desired. Thesis topics include both theoretical studies and the related problems of practicable realizations.

Industrial Connections

The Department is a member of several Centres of Excellence:

- The Canadian Institute for Telecommunications Research

- Communications and Information Technology Ontario (CITO) (this replaces the older Telecommunications Research Institute of Ontario of which we were founding members).

- TeleLearning Network (TLN), a National Centre of Excellence.

Current research areas of the centres with major participation from the Departments are: broadband ISDN access networks, transmission methods for ISDN, methods for

telecommunications software, mobile and portable wireless networks, VLSI in communications and network management using artificial intelligence methods, and wireless indoor digital communications.

Full advantage is taken of the technology-oriented industry-government-university complex in the Ottawa area. Co-operative projects are in progress with Nortel, Newbridge, Mitel, Stentor, the Department of Communications, Communications Research Centre, NRC, Bell Canada and the Department of National Defence. We are also involved in the Research Program in Managing Technological Change (MATCH), which is of particular interest to students in the M.Eng. in Telecommunications Technology Management.

Research Facilities

The Department has an excellent collection of facilities for advanced research in systems and computer engineering. There are about 100 engineering workstations, primarily SUN, but also NT and other types, on an Ethernet local area network, multiprocessor target systems, and many other stand-alone and networked workstations. The network is part of the Internet and so has access to the World Wide Web, electronic mail, network news, and much public domain research software. There are also numerous high-end PCs and Macintosh computers, many equipped for desktop video conferencing.

Software includes all of the standard programming and AI languages, symbolic algebra systems, wordprocessors, and various packages specific to telecommunications, signal processing, performance analysis, software engineering, and other areas of research.

The communications and image and signal processing labs provide state-of-the-art test, measurement, and prototyping facilities which include radio transmission and test equipment (up to EHF frequencies), co-processor boards, audio equipment, data acquisition hardware, interactive video conferencing lab equipment, robots, etc.

The main research laboratories include the following:

- Broadband Networks
- Digital Signal Processing
- Image Processing
- Internet System Software Performance
- Managing Technological Change
- Mobile and Portable Communications
- Network Management and Artificial Intelligence
- Personal Communication Systems

- Radio Communications
- Real-Time and Distributed Systems
- Robotics, Automation, and Control
- TeleLearning

Master of Applied Science and Master of Engineering in Electrical Engineering

The M.A.Sc. and M.Eng. in Electrical Engineering are offered through the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) which is jointly administered by the Department of Systems and Computer Engineering and the Department of Electronics at Carleton University, and the School of Information Technology and Engineering at the University of Ottawa. For further information about the M.A.Sc. and the M.Eng. in Electrical Engineering, including admission and program requirements, please see the Institute's section in this Calendar.

The M.Eng. is also available as part of ConGESE (Consortium for Graduate Education in Software Engineering), a collaborative program offering a specialization in software engineering. This program is geared towards software professionals working for participating industrial partners. The ConGESE program imposes further regulations and requirements on the existing program. The degree awarded will in each case specify the discipline of the participating unit with specialization in software engineering. Additional information is available from the graduate supervisor.

Doctor of Philosophy in Electrical Engineering

The Ph.D. in Electrical Engineering is offered through the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) which is jointly administered by the Department of Systems and Computer Engineering and the Department of Electronics at Carleton University, and the School of Information Technology and Engineering at the University of Ottawa. For further information about the Ph.D. in Electrical Engineering, including admission and program requirements, please see the Institute's section of this Calendar.

Master of Science in Information and Systems Science

The M.Sc. in Information and Systems Science is specifically designed for those who do not have a background in electrical engineering or computer science. This program is offered in cooperation with the School of Computer Science and the School of Mathematics and Statistics at Carleton University. Please see the

Information and Systems Science section of this Calendar for details.

Master of Engineering in Telecommunications Technology Management

The Department of Systems and Computer Engineering offers a program of study and research leading to the degree of Master of Engineering in Telecommunications Technology Management.

The objective of the program is to train engineers and computer scientists to become competent and efficient managers of the engineering processes that deliver innovative telecommunications systems, products, and services. The emphasis is on design, development, manufacture, and technical support, areas for which engineers are normally responsible and where their technical expertise and practical knowledge are critical.

The program focuses on research in the synthesis between communication systems engineering and management of engineering processes. Within this context the following areas receive major attention:

- Management of Engineering Processes
- Network Design, Protocols and Performance
- Software Engineering
- Wireless and Satellite Communications
- Manufacturing Systems Analysis Close links are maintained with the engineering and technological communities, and an effort is made to direct students to thesis and project work of current theoretical and practical significance. The research results should provide useful contributions to the efficient management of engineering processes and the related activities in the telecommunications field.

Admission Requirements

The normal requirement for admission to the master's program is a bachelor's degree in electrical engineering, computer science or a related discipline, with at least high honours standing. Candidates are required to have two years experience in technical work in telecommunications prior to admission.

Candidates applying for admission with degrees not in the discipline of engineering will be considered by the admissions committee. The committee is responsible for establishing criteria for degree equivalencies.

Program Requirements

Subject to the approval of the admissions committee, students in the master's program

may choose to complete the degree by successfully completing either a thesis or a project.

Master's Degree by Thesis

All master's students in the thesis option are required to complete a total of 5.5 credits as follows:

- 1.5 compulsory credits including: TTMG 5001; TTMG 5002; and TTMG 5003
- 2.0 approved credits from the list of restricted elective courses below
- a thesis equivalent to 2.0 credits

Master's Degree by Project

All master's students in the project option are required to complete a total of 5.5 credits of which at least 5.0 must be at the 5000-level or above, as follows:

- 1.5 compulsory credits including: TTMG 5001; TTMG 5002; and TTMG 5003
- 2.0 approved credits from the list of restricted elective courses below
- 1.0 credit of approved non-restricted electives
- a graduate project equivalent to 1.0 credit

Restricted Elective Courses

Students in the master's program must complete 1.0 credit in the field of management of engineering processes and 1.0 credit in communication systems engineering. Courses in each of the four sub-fields and the field of management of engineering processes are listed below.

The sub-fields in communication systems engineering are:

- Software Engineering
- Wireless and Satellite Communications
- Network Design, Protocols and Performance
- Manufacturing Systems Analysis

All courses in the field of communication systems engineering are offered by the Department of Systems and Computer Engineering and begin with the prefix SYSC

Communication Systems Engineering
- Software Engineering

  SYSC 5007, SYSC 5101, SYSC 5301, SYSC 5305, SYSC 5503, SYSC 5701, SYSC 5703, SYSC 5704, SYSC 5706, SYSC 5707, SYSC 5709, SYSC 5802

- Wireless and Satellite Communications

  SYSC 5503, SYSC 5504, SYSC 5606, SYSC 5608

- Network Design, Protocols and Performance

    SYSC 5001, SYSC 5004, SYSC 5005, SYSC 5007, SYSC 5101, SYSC 5109, SYSC 5201, SYSC 5207, SYSC 5503, SYSC 5607, SYSC 5706, SYSC 5801, SYSC 5808

- Manufacturing Systems Analysis

    SYSC 5001, SYSC 5004, SYSC 5802, EAJC 5207

Management of Engineering Processes
TTMG 5004, TTMG 5005, TTMG 5006, TTMG 5008, TTMG 5100, TTMG 5101, TTMG 5102, TTMG 5103, TTMG 5104

Non-Restricted Elective Courses

All students in the project option of the master's program are required to complete 1.0 credit from those offered by the Department of Electronics, Department of Mechanical and Aerospace Engineering, Department of Systems and Computer Engineering, School of Industrial Design, or School of Computer Science.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003, please consult the Registration Instructions and Class Schedule booklet, published in the summer.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable. To determine the term of offering, consult the Registration Instructions and Class Schedule booklet, or online at: www.carleton.ca/cu/programs/sched_dates/.

The list of courses in the field of *communication systems engineering*, beginning with the prefix SYSC, are described below. Courses in the field of *management of engineering processes*, beginning with the prefix TTMG are described following this list.

SYSC 5001 [0.5 credit] (formerly 94.501)
(ELG 6101)
Simulation and Modeling
Simulation as a problem solving tool. Random variable generation, general discrete simulation procedure: event table and statistical gathering. Analyses of simulation data: point and interval estimation. Confidence intervals. Overview of modeling, simulation and problem solving using SIMSCRIPT, MODSIM and other languages.

SYSC 5003 [0.5 credit] (formerly 94.503)
(ELG 6103I)
Discrete Stochastic Models
Models for software, computer systems, and communications networks, with discrete states, instantaneous transitions and stochastic behaviour. Communicating finite state machines and Petri Nets. Review of concepts of probability, and of Markov Chains with discrete and continuous parameters. Basic queuing theory. Numerical methods for Markov Models.

SYSC 5004 [0.5 credit] (formerly 94.504)
(ELG 6104)
Mathematical Programming for Engineering Applications
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

SYSC 5005 [0.5 credit] (formerly 94.505)
(ELG 6105)
Optimization Theory and Methods
Advanced theory, algorithms and computer methods for optimization. Interior point methods for linear optimization, advanced methods for nonlinear and mixed-integer optimization. Search methods. Applications in engineering.
Prerequisite: SYSC 5004 or the equivalent.

SYSC 5006 [0.5 credit] (formerly 94.506)
(ELG 6106)
Design of Real-Time and Distributed Systems
Characteristics of real-time and distributed systems. Modern midware systems, such as CORBA, DCE, RMI for building distributed applications: advantages and disadvantages. Analyzing designs for robustness, modularity, extensibility, portability and performance. Implementation issues. Major course project.
Prerequisites: SYSC 3303 and SYSC 5708 or similar experience.

SYSC/COMP 5007 [0.5 credit] (formerly 95.507)
(ELG 6107)
Expert Systems
Survey of some landmark expert systems; types of architecture and knowledge representation; interferencing techniques; approximate reasoning; truth maintenance; explanation facilities; knowledge acquisition. A project to implement a small expert system will be assigned.
Prerequisite: COMP 4007 or COMP 5001 or permission of the Department.

SYSC 5101 [0.5 credit] (formerly 94.511)
(ELG 6111)
Design of High Performance Software
Designing software to demanding performance specifications. Design analysis using models of

computation, workload, and performance. Principles to govern design improvement for sequential, concurrent and parallel execution, based on resource architecture and quantitative analysis.
Prerequisite: SYSC 5704 and a course in software engineering, or the equivalent. ·

SYSC 5102 [0.5 credit] (formerly 94.512) (ELG 6112)
Performance Measurement and Modeling of Distributed Applications
Performance measurements, metrics and models of midware based systems and applications. Benchmarks, workload characterization, and methods for capacity planning and system sizing. Performance monitoring infrastructures for operating systems and applications. Introduction to the design and analysis of experiments and the interpretation of measurements.
Prerequisite: SYSC 5101 or the equivalent.

SYSC 5103 [0.5 credit] (formerly 94.513) (ELG 6113)
Software Agents
Agent-based programming; elements of Distributed Artificial Intelligence; beliefs, desires and intentions;component-based technology; languages for agent implementations; interface agents; information sharing and coordination; KIF; collaboration; communication; ontologies; KQML; autonomy; adaptability; security issues; mobility; standards; agent design issues and frameworks, applications in telecommunications.
Prerequisite: Knowledge of Java, C/C++ or Smalltalk.

SYSC 5105 [0.5 credit] (formerly 94.515) (ELG 6115)
Software Quality Engineering and Management
All aspects of software quality engineering. Software testing, at all stages of the software development and maintenance life cycle. Software reviews and inspections. Use of software measurement and quantitative modeling for the purpose of software quality control and improvement.
Precludes additional credit for CSI 5111 (COMP 5501).
Prerequisites: An undergraduate course in software engineering such as SYSC 4800 or SEG 3300, or equivalent, and basic statistics.

SYSC 5108 [0.5 credit] (formerly 94.518) (ELG 6118)
Topics in Information Systems
Recent and advanced topics in the field of Information Systems and its related areas.

SYSC 5109 [0.5 credit] (formerly 94.519) (ELG 6119)
Teletraffic Engineering
Congestion phenomena in telephone systems, and related telecommunications networks and systems, with an emphasis on the problems, notation, terminology, and typical switching systems and networks of the operating telephone companies. Analytical queuing models and applications to these systems.
Prerequisite: SYSC 5503 or ELG 5119 or the equivalent.

SYSC 5200 [0.5 credit] (formerly 94.520) (ELG 6120)
Algebraic Coding Theory
Review of Algebra, Finite Fields, Linear Block Coldes and their Properties, Hamming Codes, Cyclic Codes, Hadamard Matrices and Hadamard Codes, Golay Codes, Reed-Muller Codes, BCH and Reed-Solomon Codes, Decoding Algorithms, Coding Bounds.
Precludes additional credit for SYSC 5507 (ELG 6157).

SYSC 5201 [0.5 credit] (formerly 94.521) (ELG 6121)
Computer Communication
Computer network types, introductory queuing theory and performance analysis. OSI layering and BISDN layering modifications. Data link layer. Local area networks and random access (CSMA- CD, switched ethernet, token ring, wireless LAN). Public Networks. IP networks, addressing, routing. Transport layer, flow control. Introduction to ISDN.
Precludes additional credit for EACJ 5607 (ELG 5374) or SYSC 4602 (ELG 4181).
Prerequisite: Undergraduate preparation in probability theory equivalent to Mathematics 69.352.

SYSC 5207 [0.5 credit] (formerly 94.527) (ELG 6127)
Distributed Systems Engineering
Techniques for representing distributed systems: precedence graphs, petrinets, communicating state-machines etc. Processes, threads, synchronization and inter-process communication techniques, RPC. Protocol: OSI model, application and presentation layers. Middleware for client-server application management, CORBA. Resource management: processor allocation and load sharing. Real-time issues and scheduling.
Prerequisites: Permission of the Department.

SYSC 5300 [0.5 credit] (formerly 94.530) (ELG 6130)
Health Care Engineering
Overview of health care system/participants; biophysical measurements for diagnosis/monitoring; biomedical sensors/technology; telemedicine and applications; safety considerations; managing medical technologies/funding models for clinical engineering departments; considerations for developing countries.
Precludes additional credit for ELG 5123 (COMP 5206).
Prerequisite: Permission of the instructor.

SYSC 5305 [0.5 credit] (formerly 94.535)
(ELG 6135)
Representations, Methods and Tools for Concurrent Systems
Selected representations and methods for concurrent systems, such as UML, UML-RT, SDL, supported by current and emerging CASE tools. Comparison, differences, advantages and disadvantages. A colloquium course with most lectures consisting of student presentations based on experience with different CASE tools. Limited enrolment.
Prerequisite: Permission of the Department.

SYSC 5306 [0.5 credit] (formerly 94.536)
(ELG 6136)
Mobile Computing Systems
Systems to build mobile applications. Covers data link layer to application layer. Emphasis on existing wireless infrastructure and IETF protocols. Focuses on view of mobile application developer; communication systems, middleware and application frameworks, defacto standards proposed/developed by industry consortia.
Precludes additional credit for COMP 5402 (CSI 5142).
Prerequisites: EACJ 5607 (ELG 5374) or SYSC 5201 (ELG 6121) or permission of the Department.

SYSC 5401 [0.5 credit] (formerly 94.541)
(ELG 6141)
Adaptive and Learning Systems
System identification. Least squares and recursive identification techniques. Asymptotic and theoretical properties. Model structure selection. Prediction and estimation. Model reference adaptive control and self-tuning regulators. Nonlinear adaptive systems. Stability. Neural networks and neuro-control. Applications to robotics, control and pattern recognition.
Prerequisite: SYSC 5502 or equivalent.

SYSC 5402 [0.5 credit] (formerly 94.542)
(ELG 6142)
Advanced Dynamics With Applications to Robotics
Lagrange equations and Hamilton's principle. Dynamics of lumped parameter and continuous systems. Natural modes and natural frequencies. Forced vibrations. Stability and bifurcation. Kinematics and dynamics of rigid bodies. Gyroscopic effects. Forward and inverse kinematics of robot manipulators. Denavit-Hartenberg notation. Derivation of manipulator dynamics.

SYSC 5502 [0.5 credit] (formerly 94.552)
(ELG 6152)
Advanced Linear Systems
Modeling and state space realization. Review of signals and systems. Solution to the matrix DE. Discrete time systems and the Z transform. Canonical representations and transformations. Controllability, observability and controller and observer design. LQR design and the Kalman filter. Numerous examples and applications.

SYSC 5503 [0.5 credit] (formerly 94.553)
(ELG 6153)
Stochastic Processes
Basic concepts of randomness, as applied to communications, signal processing, and queuing systems; probability theory, random variables, stochastic processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queuing theory. Precludes additional credit for EACJ 5109 (ELG 5119).

SYSC 5504 [0.5 credit] (formerly 94.554)
(ELG 6154)
Principles of Digital Communication
Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Optium Receiver theory. Modulation and coding for reliable transmission: MPSK, MQAM, M-ary orthogonal modulation. Channel coding, trellis coded modulation. Spread spectrum and CDMA communications.
Precludes additional credit for EACJ 5506 (ELG 5375).
Prerequisite: SYSC 5503 or ELG 5119 or the equivalent (may be taken concurrently).

SYSC 5506 [0.5 credit] (formerly 94.556)
(ELG 6170)
Information Theory
Measure of information: entropy, relative entrophy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity: random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, coloured Gaussian noise and "water-filling"; Rate distortion theory; Network information theory.
Prerequisite: SYSC 5503 (ELG 6153) or ELG 5119 (ISYS 5109) or equivalent.
Precludes credit for EACJ 5501 (ELG 5170).

SYSC 5508 [0.5 credit] (formerly 94.558)
(ELG 6158)
Digital Systems Architecture
New architectural concepts are introduced. Discussion of programmable architectures (micro-controllers, DSPs, GP) and FPGAs. Memory interfacing. Scalable, superscalar, RISC, CISC, and VLIW concepts. Parallel structures: SIMD, MISD and MIMD. Fault tolerant systems and DSP architectures. Examples of current systems are used for discussions.
Prerequisite: SYSC 4507 or the equivalent.

SYSC 5600 [0.5 credit] (formerly 94.560)
(ELG 6160)
Adaptive Signal Processing
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares;

convergence and tracking performance; implementation. Applications, such as adaptive prediction, channel equalization, echo cancellation, source coding, antenna beamforming, spectral estimation.
Precludes additional credit for EACJ 5800 (ELG 5377).
Prerequisites: SYSC 5503 or ELG 5119 or equivalent; SYSC 5602 or ELG 5376 or equivalent.

SYSC 5601 [0.5 credit] (formerly 94.561)
(ELG 6161)
Neural Signal Processing
Multidimensional function approximation. The least squares adaptive algorithm and the generalized dela rule. Multi-layered perceptrons and the back-propagation algorithm. Approximation of non-linear functions. Radial basis functions. Self-organizing maps. Applications of neural signal processing to control, communications and pattern recognition.
Precludes additional credit for EACJ 5709 (ELG 5796).
Prerequisite: SYSC 5503 or ELG 6153 or equivalent. May be taken concurrently with SYSC 5503.

SYSC 5602 [0.5 credit] (formerly 94.562)
(ELG 6162)
Digital Signal Processing
Review of discrete time signals and systems, A/D and D/A conversions, representation in time, frequency, and Z domain, DFT/FFT transforms, FIR/IIR filter design, quantization effects. Correlation functions. Cepstrum analysis. Multirate signal processing. Power spectrum estimation. Introduction to joint time-frequency analysis. DSP architecture: implementation approaches. Applications.
Precludes additional credit for EACJ 5507 (ELG 5376).

SYSC 5603 [0.5 credit] (formerly 94.563)
(ELG 6163)
Digital Signal Processing: Microprocessors, Software and Applications
Characteristics of DSP algorithms and architectural features of current DSP chips: TMS320, DSP-56xxx, AD-21xxx and SHARC. DSP multiprocessors and fault tolerant systems. Algorithm/software/hardware architecture interaction, program activity analysis, development cycle, and design tools. Case studies: LPC, codecs, FFT, echo cancellation, Viterbi decoding.
Prerequisite: SYSC 5602 or ELG 5376 or the equivalent.

SYSC 5604 [0.5 credit] (formerly 94.564)
(ELG 6164)
Advanced Topics in Digital Signal Processing
Recent and advanced topics in the field of digital signal processing and its related areas.
Prerequisites: SYSC 5602 or ELG 5376 or the equivalent.

SYSC 5605 [0.5 credit] (formerly 94.565)
(ELG 6165)
Advanced Digital Communication
Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels: diversity concepts, modeling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels.
Precludes additional credit for EACJ 5704 (ELG 5780).
Prerequisite: SYSC 5504 or the equivalent.

SYSC 5606 [0.5 credit] (formerly 94.566)
(ELG 6166)
Introduction to Mobile Communications
Mobile radio channel characterization: signal strength prediction techniques and statistical coverage; fading; delay spread; interference models and outage probabilities. Digital modulation and transmission system performance. Signal processing techniques: diversity and beamforming, adaptive equalization, coding. Applications to TDMA and CDMA cellular systems.
Co-requisite: Can be taken concurrently with SYSC 5503 and SYSC 5504.

SYSC 5607 [0.5 credit] (formerly 94.567)
(ELG 6167)
Source Coding and Data Compression
Discrete and continuous sources. Discrete sources: Huffman coding & run length encoding. Continuous sources: waveform construction coding; PCM, DPMC, delta modulation; speech compression by parameter extraction; predictive encoding; image coding by transformation and block quantization. Fourier and Walsh transform coding. Applications to speech, television, facsimile.
Prerequisite: SYSC 5503 or ELG 5119 or the equivalent.

SYSC 5608 [0.5 credit] (formerly 94.568)
(ELG 6168)
Wireless Communications Systems Engineering
Multi-user cellular and personal radio communication systems; frequency reuse, traffic engineering, system capacity, mobility and channel resource allocation. Multiple access principles, cellular radio systems, signalling and interworking. Security and authentication. Wireless ATM, satellite systems, mobile location, wireless LANs, wireless local loops, broadband wireless, etc.
Corequisites: SYSC 5503 or ELG 5119, and SYSC 5504 or ELG 5375, or their equivalents.

SYSC 5609 [0.5 credit] (formerly 94.569)
(ELG 6169)
Digital Television
Television standards: NTSC, PAL, SECAM, and HDTV. Sampling and quantization of television signals: rec 601-1. Digital video compression: inter and

intra-frame methods, spatial and transform/ wavelet coding; H.261 and MPEG standards. Video conferencing systems and other digital video processing applications.

SYSC 5700 [0.5 credit] (formerly 94.570) (ELG 6170)
Spread Spectrum Systems
Types of spread spectrum systems, FH and DS-SS, Hybrid DS/FH-SS. Pseudo-noise generators: statistical properties of M sequences, Galois field connections, Gold codes. Code tracking loops, initial synchronization of receiver spreading code. Performance in jamming environments and fading channels. Code division multiple access systems.
Prerequisite: SYSC 5504 or (ELG 6154) or the equivalent.

SYSC 5701 [0.5 credit] (formerly 94.571) (CSI 5117)
Operating System Methods for Real-Time Applications
Principles and methods for operating system design with application to real-time, embedded systems. Concurrent programming: mechanisms and languages; design approaches and issues; run-time support (kernel). Methods for hard real-time applications. Methods for distributed systems. Programming assignments in a suitable programming language.
Prerequisites: SYSC 3303 or SYSC 5704 or equivalent courses and/or experience. Programming experience in high level and assembly languages.

SYSC 5703 [0.5 credit] (formerly 94.573) (ELG 6173)
Integrated Database Systems
Database definitions, applications, architectures. Conceptual design based on entity-relationship, object-oriented models. Relational data model: relational algebra and calculus, normal forms, data definition and manipulation languages. Database management systems: transaction management, recovery and concurrency control. Current trends: object-oriented, knowledge-based, multimedia, distributed databases.
Prerequisite: SYSC 5704 or the equivalent.

SYSC 5704 [0.5 credit] (formerly 94.574) (ELG 6174)
Elements of Computer Systems
Concepts in basic computer architecture, assembly languages, high level languages including object orientation, compilers and operating system concepts (including concurrency mechanisms such as processes and threads and computer communication). Designed for graduate students without extensive undergraduate preparation in computer system engineering (or the equivalent experience).
Prerequisites: Programming experience with at least one high level language and permission of the Department.

SYSC 5706 [0.5 credit] (formerly 94.576) (ELG 6176)
Analytical Performance Models of Computer Systems
Analytical modeling techniques for performance analysis of computing systems. Theoretical techniques covered include single and multiple class queuing network models, together with a treatment of computational techniques, approximations, and limitations. Applications include scheduling, memory management, peripheral devices, databases, multiprocessing, and distributed computing.
Prerequisite: SYSC 5003, SYSC 5503 or ELG 5119, or the equivalent.

SYSC 5708 [0.5 credit] (formerly 94.578) (ELG 6178)
Development of Real-Time and Distributed Software with Reusable Components
Advanced object-oriented design and programming of real-time and distributed systems using C++ and/or Java. Object-oriented features: inheritance, polymorphism, templates, exception handling. Concurrency issues. Design patterns and frameworks for distributed systems, with examples from communication applications. Design issues for reusable software.
Prerequisites: Knowledge of C++ and/or Java, of operating system concepts, and permission of the Department.

SYSC 5709 [0.5 credit] (formerly 94.579) (ELG 6179)
Advanced Topics in Software Engineering
Recent and advanced topics in the field of software engineering and related areas. Primary references are recent publications in the field.
Prerequisite: Permission of the Department.

SYSC 5800 [0.5 credit] (formerly 94.580) (ELG 6180)
Network Computing
Design and Java implementation of distributed applications that use telecommunication networks as their computing platform. Basics of networking; Java networking facilities. Introduction to open distributed processing; CORBA, JavaIDL, JavaRMI, CGI/HTTP, DCOM, Componentware; Enterprise JavaBeans, ActiveX. Agents: Java code mobility facilities. Security issues; Java security model.

SYSC 5801 [0.5 credit] (formerly 94.581) (ELG 6181)
Advanced Topics in Computer Communications
Recent and advanced topics in computer-communication networks intended as a preparation for research. Students are expected to contribute to seminars or present lectures on selected topics.
Prerequisites: SYSC 5201 or ELG 5374 or equivalent and permission of the Department.

SYSC 5802 [0.5 credit] (formerly 94.582)
(ELG 6182)
Introduction to Information and System Science
An introduction to the process of applying
computers in problem solving. Emphasis on the
design and analysis of efficient computer
algorithms for large, complex problems.
Applications in a number of areas are presented:
data manipulation, databases, computer
networks, queuing systems, optimization. (Also
listed as MATH 5802, COMP 5802 and ISYS
5802.)

SYSC 5803 [0.5 credit] (formerly 94.583)
(ELG 6183)
Logic Programming
Review of relational databases, first order
predicate calculus, semantics of first order
models, deductive querying. Proof theory,
unification and resolution strategies. Introduction
to Prolog, and/or parallelism and Concurrent
Prolog. Applications in knowledge representation
and rule-based expert systems.

SYSC 5804 [0.5 credit] (formerly 94.584)
(ELG 6184)
Advanced Topics in Communications Systems
Recent and advanced topics in communications
systems.
Prerequisite: Permission of the Department.

SYSC 5806 [0.5 credit] (formerly 94.586)
(ELG 6186)
**Object Oriented Design of Real-Time and
Distributed Systems**
Advanced course in software design dealing with
design issues at a high level of abstraction. Design
models: use case maps for high-level behaviour
description; UML for traditional object-oriented
concerns. Design patterns. Forward, reverse, and
re-engineering. Substantial course project on
applications chosen by students.
Prerequisite: Permission of the Department.

SYSC 5807 [0.5 credit] (formerly 94.587)
(ELG 6187)
Advanced Topics in Computer Systems
Recent and advanced topics in computer
systems. The course will generally focus on one
or more of the following areas: specification,
design, implementation, and modeling/analysis.
Students may be expected to contribute to
lectures or seminars on selected topics.
Prerequisite: Permission of the Department.

SYSC 5808 [0.5 credit] (formerly 94.588)
(ELG 6188)
Communications Network Management
Network management issues. WANs and LANs.
The internet and ISO models of network
management. Network management protocols
SNMP, CMIP, CMOT, etc. Events, Managed
Objects and MIBs. Fault management techniques.
Current diagnostic theory and its limitations. AI
and Machine learning approaches. Monitoring
and fault management tools.
Prerequisite: SYSC 5201 or equivalent.

SYSC 5900 [0.5 credit] (formerly 94.590)
Systems Engineering Project
Students pursuing the non-thesis M.Eng.
program conduct an engineering study, analysis,
and/or design project under the supervision of
a faculty member.

SYSC 5901 [1.0 credit] (formerly 94.591)
Systems Engineering Project
Project similar to SYSC 5900, but either of
greater scope or longer duration.

SYSC 5903 [1.0 credit] (formerly 94.593)
Cooperative Program Project
A one-term course, carrying a full-course credit,
for students pursuing the cooperative M.Eng.
program. An engineering study, analysis, and/
or design project under the supervision of a faculty
member. This course may be repeated for credit.

MATH/SYSC/COMP 5905 [2.0 credits]
(formerly 95.595)
M.C.S. Thesis

SYSC 5906 [0.5 credit] (formerly 94.596)
(ELG 6196)
Directed Studies

MATH/ISYS/SYSC/COMP 5908 [1.5 credits]
(formerly 95.598)
**M.Sc. Thesis in Information and Systems
Science**

SYSC 5909 [2.0 credits] (formerly 94.599)
M.Eng. Thesis

SYSC 6909 (formerly 94.699)
Ph.D. Thesis

The following are courses in the field of
management of engineering processes, and
begin with the prefix TTMG.

TTMG 5001 [0.5 credit] (formerly 96.501)
Management Principles for Engineers
Develops a common level of knowledge among
students on topics in project management,
leadership, industrial marketing, managerial
economics and organizational behaviour. These
topics are relevant for engineers and computer
scientists who manage the engineering processes
that deliver innovative telecommunications
systems, products and services.

TTMG 5002 [0.5 credit] (formerly 96.502)
Telecommunications Technology
Fundamentals of telecommunications technology
with emphasis on importance of bandwidth,
communications reliability and networks. Topics
include: information sources and coding of
outputs; channel characteristics; signals;
networks, signalling and switching; standards and
regulation; major world systems and operators;
and the thrust of new and future technology.

TTMG 5003 [0.5 credit] (formerly 96.503)
Issues in Telecommunications
Discussion of key readings relevant to the
telecommunications industry. Topics include the
introduction of new products to the global market,

technology sourcing, intellectual property rights, industry trends, technology and ethics, user interface design, new business opportunities and product identification, industry characteristics, regulation and international competition.

TTMG 5004 [0.5 credit] (formerly 96.504)
Management of Design Systems
The focus is on how to design, maintain, expand and evolve organizations that deliver hardware, software and systems designs, and on the methods and tools used to improve their performance. Topics include: essence of design; how to set-up and lead fast-to-market organizations.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5005 [0.5 credit] (formerly 96.505)
Management of Telecommunications System Design
The focus is on the groups that evolve the architecture and technological infrastructures of firms and on product management. Topics include: relationship between architecture and product management; appropriability regimes; technology and complementary assets; managing projects that deliver products at different stages of their life cycles.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5006 [0.5 credit] (formerly 96.506)
Management of Software Engineering Projects
Models for the development of software. Software project management tools. Quality control. Risk assessment and management. Examples are drawn from software development in telecommunications applications.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5008 [0.5 credit] (formerly 96.508)
Corporate Communications Networks
Communications networks as a vital resource within organizations. Private networks as an infrastructure for information flow within a firm and across its interfaces. Applications and operations of corporate telecommunications networks. Networks as a source of competitive advantage. Implementation issues.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5100 [0.5 credit] (formerly 96.510)
Communications Standards
Importance of global standards in telecommunications and information technology for product development and business. Relevant public standards classified by type. The standards setting process. Formulation and execution of standards setting strategies. Integrating the firm's standards program with engineering processes, product management, systems groups and marketing.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5101 [0.5 credit] (formerly 96.511)
Integrated Product Development
The new product introduction process and time-based competition, basic concepts of integrated product development (concurrent engineering), the voice of the customer, quality function deployment, cross-functional teams, integrating information systems and technical tools, organizational support, manufacturing and design, cost estimation, implementation problems.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5102 [0.5 credit] (formerly 96.512)
Managing Full-Scale Production
Overall philosophy of just-in-time and time-based competition; just-in-time production and manufacturing resource planning; total quality management; socio-technical systems and employee participation; advanced manufacturing; manufacturing and facilities strategy, capacity planning; manufacturing flexibility; product/process evolution and the experience curve; service aspects of manufacturing.
Prerequisite: TTMG 5001 and TTMG 5002.

TTMG 5103 [0.5 credit] (formerly 96.513)
Advanced Topics in Telecommunications Technology Management
In-depth exploration of an advanced topic in the field of telecommunications technology management. A different topic is covered each semester and more than one section, with different topics, may be offered in the same semester.
Prerequisite: One of TTMG 5004, TTMG 5005, TTMG 5101, or TTMG 5102.

TTMG 5104 [0.5 credit] (formerly 96.514)
Directed Studies in Design and Manufacturing Management
The student explores, through extensive literature surveys, specific topics in the areas of design and manufacturing management. The objective is to acquire a suitable background to initiate and complete thesis work requiring this preparation. Precludes credit for any other directed studies in the program.

TTMG 5901 [1.0 credit] (formerly 96.591)
M.Eng. Project

TTMG 5909 [2.0 credits] (formerly 96.599)
M.Eng. Thesis

TTMG 5104 [0.5 credit] (formerly 96.514)
Directed Studies in Design and Manufacturing Management
The student explores, through extensive literature surveys, specific topics in the areas of design and manufacturing management. The objective is to enable study on a specific topic to acquire a suitable background to initiate and complete thesis work. Precludes credit for any other directed studies.

TTMG 5901 [1.0 credit] (formerly 96.591)
M.Eng. Project

TTMG 5909 [2.0 credits] (formerly 96.599)
M.Eng. Thesis

Women's Studies

Dunton Tower 1419
Telephone: 520-6645
Fax: 520- 2622
Web site: www.carleton.ca/womensstudies/

The Institute

Director, L. Pauline Rankin

The Pauline Jewett Institute of Women's Studies does not offer a program at the graduate level. However, it does offer graduate-level courses which can, with the permission of the school, institute, or department in which the student is enrolled, be used towards a degree program.

Graduate Courses

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings for 2002-2003 and to determine the term of offering, consult the Registration Instructions and Class Schedule booklet, published in the summer and also available online at www.carleton.ca/cu/programs/sched_dates/.

Course Designation System

Carleton's course designation system has been restructured. The first entry of each course description below is the new alphanumeric Carleton course code, followed by its credit value in brackets. The old Carleton course number (in parentheses) is included for reference, where applicable.

WOMN 5000 [0.5 credit] (formerly 09.500)
Issues for Feminist Scholarship
An interdisciplinary examination of the development of feminist scholarship. Critical analysis of such questions as the connection between feminist scholarship and activism; the interconnections between gender and social class, race/ethnicity, and sexual orientation; the challenge of integrating feminist research into the traditional disciplines.
Prerequisite: Graduate standing and permission of the Institute.

WOMN 5001 [0.5 credit] (formerly 09.501)
Research Seminar in Women's Studies
A seminar in which each student undertakes a cross-disciplinary research project for which gender is a primary category of analysis.
Prerequisite: WOMN 5000 and permission of the Institute.

General Information

- Calendar of Milestones
- Faculty - Graduate Supervisors
- Officers of the University
- Public Lectures

Calendar of Milestones

The Institution

1942
The Ottawa Association for the Advancement of Learning was established to develop Carleton College. The College offered only evening classes in introductory university subjects, with some courses in public administration.

1943
The Ottawa Association for the Advancement of Learning was incorporated and the Institute for Public Administration was established.

1945
Beginning of day classes and full-time teaching in arts, science, journalism, and first-year engineering. Establishment of the Faculty of Arts and Science.

1946
Move from rented premises to First Avenue campus, formerly Ottawa Ladies' College. First degrees awarded in journalism and public administration.

1947
The College committed itself to develop pass and four-year honours programs.

1949
First undergraduate pass degrees in arts, science, and commerce awarded. Formation of Senate.

1950
First honours degrees in arts and science awarded.

1952
The Carleton College Act, 1952 passed by the Ontario Legislature. This changed the corporate name to Carleton College and confirmed the power to grant degrees. Property for Rideau River campus acquired.

1953
Establishment of the School of Public Administration.

1954
Appointment of Architectural Associates for Carleton to prepare a master plan for Rideau River campus, and to design the first group of buildings. First honorary degree (LL.D.) conferred on Dag Hammarskjöld, Secretary-General of the United Nations.

1955
First Master of Arts degree awarded.

1957
The Carleton University Act, 1957. Establishment of the School of Engineering. Establishment of the Institute of Canadian Studies.

1958
First Master of Science degree awarded.

1959
Move to Rideau River campus, following construction of the Henry Marshall Tory Building (science), the Maxwell MacOdrum Library, and Norman Paterson Hall (arts).

1961
First Ph.D. degree in science awarded. First degrees in engineering awarded.

1962
Southam Hall, the University Commons, Renfrew House and Lanark House (residences) completed. Norman Paterson Hall extended, and University Union opened.

1963
First Master of Engineering degree awarded. Reorganization into the Faculties of Arts, Engineering, Science, and Graduate Studies and Research.

1964
The C.J. Mackenzie Building (engineering) completed.

1965
The E.W.R. Steacie Building (chemistry), Grenville House and Russell House (residences), Maintenance Building, and Heating Plant completed.

1966
First Ph.D. degree in engineering awarded. The Physics Building completed (designated in 1972 as the Herzberg Laboratories for Physics). Establishment of the Schools of International Affairs and Commerce.

1967
Loeb Building (social sciences) completed. Integration of St. Patrick's College as a division of the Faculty of Arts. Integration of the School of Social Work.

1968
First Ph.D. degree in arts awarded. First Master of Social Work degree awarded. Establishment of the School of Architecture.

1969
Controlled Environmental Facility (biology), Administration Building, Glengarry House (residence), and University Commons (residence cafeteria) completed.

1970
University Centre and Parking Garage completed.

1971
Arts Tower completed.

1972
Architecture Building completed. School of Social Work accommodated on the Rideau River campus.

1973
St. Patrick's College moves to new facility on the Rideau River campus. First degrees in architecture awarded. New athletic complex containing 50-metre pool and fitness centre opened. School of Industrial Design established.

1974
Faculty of Graduate Studies and Research expanded into the Faculty of Graduate Studies and Research. School of International Affairs renamed the Norman Paterson School of International Affairs. Master of Journalism program approved for September 1974. Master of Arts programs in anthropology and in religion approved for September 1975. Program leading to Certificate in the Teaching of English as a Second Language established.

1975
Lester B. Pearson Chair for International Affairs approved for January 1, 1975. Establishment of Gerhard Herzberg Lecture Series in Science.

1976
First Dunton Alumni Award presented, January 1976. Creation of the Paterson Centre for International Programs in March 1976. Division of the Faculty of Arts into two separate faculties: the Faculty of Arts and the Faculty of Social Sciences, effective July 1976. First Master of Journalism degrees awarded, November 1976.

1977
Opening of the Criminology and Corrections concentration at St. Patrick's College, April 1977.

1978
School of Continuing Education established. Credit courses offered on cable television for the first time. Institute of Biochemistry established.

1979
St. Patrick's College ceased to operate as an academic unit of the University. Academic programs of the college continue as University programs, except for the Unified Liberal Arts Program.

1980
Establishment of the School of Computer Science. Establishment of the Chair of Office Automation in the Faculty of Engineering.

1981
Establishment of the Ottawa-Carleton Institute for Graduate Studies and Research in Chemistry, a joint program with the University of Ottawa. Establishment of a joint Ph.D. program in economics with the University of Ottawa.

1982
Establishment of the Ottawa-Carleton Centre for Geoscience Studies, representing the combined research strengths of Carleton University and the University of Ottawa, with programs leading to M.Sc. and Ph.D. degrees in most areas of geology. Establishment of a joint master's program in computer science with the University of Ottawa.

1983
Establishment of four joint graduate programs with the University of Ottawa: the Ottawa-Carleton Centre for Graduate Studies and Research in Biology; the Ottawa-Carleton Centre for Graduate Studies and Research in Physics; the Ottawa-Carleton Institute for Graduate Studies and Research in Electrical Engineering; and the Ottawa-Carleton Graduate Specialization in Neuroscience.

1984
Establishment of three joint graduate programs with the University of Ottawa in the areas of civil engineering, mechanical and aeronautical engineering, and mathematics and statistics.

1985
Master of Management Studies program established in the School of Business. The School of Public Administration offers a concentration in development administration in conjunction with the Norman Paterson School of International Affairs. An additional floor on one wing of the Herzberg Laboratories for Physics is constructed to house the School of Computer Science.

1986
The Social Sciences Research Building, the first new building on campus in a decade, is built to accommodate the rapidly-expanding research activity in the Faculty of Social Sciences. Construction of an annex on top of the Architecture Building to provide additional space for the Faculty of Engineering.

1987
The Institute of Women's Studies is established. The Arts Tower is renamed Davidson Dunton Tower/Édifice Davidson Dunton in honour of Arnold Davidson Dunton, former Carleton University President and Director of the Institute of Canadian Studies. Major revisions to the Undergraduate Exchange Agreement with the University of Ottawa extend opportunities for students to study at both universities. The University launches the Carleton University Challenge Fund, the largest fund-raising campaign in its history.

1988
Canada's first full Bachelor of Engineering program in Aerospace Engineering is established. Bell-Northern Research Limited and the Natural Sciences and Engineering Research Council provide funding for an Industrial Research Chair in Computer-Aided Engineering within the

Department of Electronics. The Departments of Electronics and Systems and Computer Engineering are major partners in the Telecommunications Research Institute of Ontario (TRIO), one of seven "centres of excellence" chosen by the provincial government for scientific research. The Faculty of Science introduces cooperative education programs in computer science and biochemistry/biotechnology.

1989

The University launches its first major program of construction and renovation in more than 20 years. Four capital projects are initiated: an addition to the MacOdrum Library; the Minto Centre for Advanced Studies in Engineering; a 400-bed residence building; and an addition to Southam Hall. A fifth project, the Life Sciences Research Building, is completed in 1989. The Institute of Political Economy is established. The Canadian Centre for Trade Policy and Law, a joint initiative of the Norman Paterson School of International Affairs at Carleton and the Faculty of Law at the University of Ottawa, is established.

1990

A new Ph.D. program in computer science, offered jointly with the University of Ottawa, is established. The University introduces a Bachelor of Social Work degree program. The Paul Menton Centre for Persons with Disabilities is opened. The Centre for Research in Particle Physics is established to carry on the work of the National Research Council's large-scale physics projects.

1991

Establishment of the Carleton University Development Corporation. $11 million extension to the MacOdrum Library opened. The university's $30 million Challenge Fund campaign surpassed its goal; $1.5 million "enhancement" campaign announced. Registrarial services for arts and social sciences re-organized into two separate offices. Establishment of the Centre for Analytical and Environmental Chemistry. Establishment of the School of Comparative Literary Studies. Establishment of the School for Studies in Art and Culture (bringing together the Departments of Art History, Film Studies, and Music). Establishment of the international exchange agreement between Carleton University, four Swedish universities, and three other Canadian universities (Laval, York, and the University of British Columbia). Establishment of the Carleton University/Polish faculty exchange agreement. Establishment of the Chair for Management in Technological Change. Establishment of M.A. programs in political economy, communication, legal studies, and applied language studies. Establishment of the women's history field in the Ph.D. program in history. Establishment of the Ph.D. program in public policy in the School of Public Administration.

1992

The University celebrates its 50th anniversary. Institute for Interdisciplinary Studies, which includes a B.A. program in environmental studies, is established. Department of Civil Engineering renamed Department of Civil and Environmental Engineering to reflect emphasis on the environment and new undergraduate program in environmental engineering. School of Journalism renamed School of Journalism and Communication, and Institute of Canadian Studies becomes School of Canadian Studies. The Centre for Aboriginal Education, Research and Culture is established. A new Ph.D. program in public policy, the first of its kind in Canada, is offered by the School of Public Administration, and a master's program in Canadian art history is introduced. The Carleton University Art Gallery and the Minto Centre for Advanced Studies in Engineering are opened. The Governor General of Canada and Head of the Canadian Heraldic Authority, His Excellency the Right Honourable Ramon John Hnatyshyn, grants the arms and flag of Carleton University at the fall convocation ceremonies.

1993

Centre for Memory Assessment and Research established. Teaching and Learning Resource Centre established. Institute of Soviet and East European Studies renamed Institute for Central/ East European and Russian Area Studies. Carleton University hosts the 1993 Learned Societies Conference. Construction begins on new Inco Centre. Institute of Women's Studies renamed Pauline Jewett Institute of Women's Studies. Administration Building renamed Robertson Hall.

1994

New Industrial Research Chair in Performance Engineering of Real-Time Software established. The Inco Centre officially opened. Research Facility for Electron Microscopy opened. New Ph.D. program in Public Policy established. New Bachelor of International Business program approved. Colonel By Child Care opened. Construction begins on the new Carleton Technology and Training Centre.

1995

Carleton Technology and Training Centre opened. Bachelor of Humanities undergraduate degree program established. College of the Humanities approved.

1997

Two new faculties created: the Faculty of Arts and Social Sciences and the Faculty of Public Affairs and Management. Department of Religion joined the College of the Humanities. School of Architecture modified its program to create a four-year degree program, with the professional designation provided by the two-year master's program. Bachelor of Arts program improved with standardization of programs across all departments and introduction of

programs to allow students to improve their academic skills and to "tailor" their degrees to specific goals. Physics undergraduate degree program replaced with an applied physics program. Several small language programs closed: German, Italian, Russian, Spanish) as well as undergraduate programs in Comparative Literary Studies and Classics. New undergraduate program in Communications Engineering established. Co-operative education programs offered in all engineering programs.

The following graduate programs were established: Ph.D. in Cognitive Science; Ph.D. in Communications; Master of Arts in Film Studies; Master of Arts in Public Administration (with a Concentration in Innovation, Science, and Technology Policy); and the Graduate Certificates in Conflict Resolution and in Health and Social Policy in Development.

1998
Faculty of Science realigned its departments into the College of Natural Sciences and the School of Mathematics and Statistics. Centre for Initiatives in Education added to the Faculty of Arts and Social Sciences. Department of Geography renamed the Department of Geography and Environmental Studies.

Two new degree programs created: Bachelor of Mathematics and Bachelor of Public Affairs and Policy Management. Two new programs added to the Bachelor of Arts degree program: Art and Culture, and Criminology and Criminal Justice.

New programs established in Computational Chemistry, Engineering Physics and Software Engineering. Master of Science in Information and Systems Science (M.Sc.I.S.S.) program expanded.

School of Computer Science established a computer retraining certificate program. Office to coordinate co-op placements for engineering and science students opened.

1999
A $6.4 million expansion to the Minto Centre for Advanced Studies in Engineering is approved. The addition of three floors will provide additional teaching and research space to accommodate the significant growth in informational technology programs.

Two new computational science programs are introduced--Computational Biology and Computational Biochemistry. Senate approves new M.Eng. and Ph.D. programs in Environmental Engineering, as well as the establishment of minors in Classics, German, Spanish, Italian, and Russian. Other new programs include a B.A. (Honours) in Geographic Information Processing, a Combined Honours in Human Rights, a B.A. and B.A. (Honours) in History and Theory of Architecture, and a new Ph.D. in Cultural Mediation. New guidelines are approved for applicants from community colleges.

The Institute of Comparative Studies in Literature, Art and Culture is established within the Faculty of Arts and Social Sciences.

The Nortel Networks-Carleton University Laboratory for Advanced Materials Research at Carleton University opens, allowing researchers to create the next wave of information technology products.

Arthur Kroeger College of Public Affairs is opened in October. The new College, named in honour of Carleton University's Chancellor and one of Canada's leading experts in public affairs, Arthur Kroeger, is the home of the new Bachelor of Public Affairs and Policy Management (B.P.A.P.M.) program.

The Texas Instruments and Nortel Networks DSP Lab for Advanced Communications Research and Education opens in September, making Carleton the first university in Canada to become a Texas Instruments (TI) digital signal processing (DSP) "elite" laboratory.

The Carleton University School of Social Work celebrates its 50th anniversary.

The wind tunnel in the MacKenzie Building is renamed to illustrate the long-established relationship between Carleton and Pratt and Whitney Canada (PWC). The lab gives graduate students, researchers and PWC engineers the opportunity to collaborate on leading-edge turbine aerodynamics research.

The Institute of Central/East European and Russian-Area Studies is renamed the Institute of European and Russian Studies. The B.A. (Honours) in CERAS is changed to European and Russian Studies.

2000
The Faculty of Science introduces a new Seminar in Science to support first-year students entering Science at Carleton. The Enriched Support Program is expanded to include the sciences. A new five-credit Sonic Design Diploma is launched to provide focused training in musical applications in the computing field. Carleton's introduces a new B.A. program in Classics, Religion, and Humanities. Computational Geophysics is added to the Computational Sciences programs. A new joint Ph.D. program in Canadian Studies with Trent University is approved. The B.A. in Religion and the Certificate in Law Enforcement Studies are closed. A Minor in Technology, Society, and Environmental Studies is introduced.

New University-wide regulations for academic standing, promotion, and graduation are approved.

Construction begins on several new campus initiatives, including a new Residence, a Biology building, and a Light Rail Project.

The three-storey addition to the Minto CASE Building is completed.

Carleton is awarded $40 million by the provincial government for extra classroom and lab space, improved Science facilities, and enhanced research and private sector partnerships.

The first class of Carleton Humanities students graduates at Spring Convocation.

For the first time in Carleton's history, the average first-year high school entrance grade is more than 80 percent.

2001

The School of Public Administration is formally renamed the School of Public Policy and Administration.

The Ottawa-Carleton Institute for Environmental Engineering is created to house the new Masters and Ph.D. programs in Environmental Engineering. Thesis-based Master of Applied Science degrees in Engineering are approved to distinguish them from the course-based Master of Engineering degrees in all the joint graduate programs with the University of Ottawa.

A Minor in Aboriginal Studies is introduced in Canadian Studies.

The Master of Management Studies program is changed to the Master of Business Administration. (M.B.A.)

The School of Computer Science becomes the first in Canada to make the Information Systems Professional (I.S.P.) designation an integral part of the Bachelor of Computer Science degree program.

A new graduate diploma in European Integration Studies is introduced.

Over $120 million in building projects are undertaken on campus. These include new state-of-the-art biology facilities and a six-storey residence with beds for an additional 395 students. Construction begins on centralized student services facilities, and a new classroom pavilion.

The University becomes a major stop on Ottawa's new Light Rail system this year.

The Eric Sprott School of Business is born. The School is named after Carleton alumnus Eric Sprott, Chairman of Sprott Securities Inc., who made a $10-million donation to the School this year.

Chancellors

1952 - 1954
Harry Stevenson Southam

1954 - 1968
Chalmers Jack Mackenzie

1969 - 1972
Lester Bowles Pearson

1973 - 1979
Gerhard Herzberg

1980 - 1990
Gordon Robertson (Emeritus 1992 -)

1990 - 1992
Pauline Jewett

1993 -
Arthur Kroeger

Presidents

1942 - 1947
Henry Marshall Tory

1947 - 1955
Murdoch Maxwell MacOdrum

1955 - 1956
James Alexander Gibson (acting)

1956 - 1958
Claude Thomas Bissell

1958 - 1972
Arnold Davidson Dunton

1972 - 1978
Michael Kelway Oliver

January 1 - May 15, 1979
James Downey (*pro tempore*)

1979 - 1989
William Edwin Beckel

1989 - 1996
Robin Hugh Farquhar

1996 -
Richard J. Van Loon

Faculty

The following members of the faculty of Carleton University, together with Adjunct Research Professors, have been approved as supervisors of graduate theses and research essays, under criteria established by the Senate of the University. Since some appointments will be made subsequent to the publication deadline for this Calendar, students are advised to consult their department for a complete list.

Architecture

K.S. Andonian, M.Arch. (Yerevan Polytechnic), M.A.Sc., Ph.D. (Waterloo), M.R.A.I.C.

Manuel A. Baez, B.Arch. (Cooper Union), M.Arch. (Cranbrook)

Y. Cazabon, Dipl.A.T. (Algonquin), B.Arch. (Carleton), M.Arch. (McGill), M.R.A.I.C.

J. Debanne, B.Arch. (Carleton), M.Arch. (McGill)

Tom Dubicanac, B.Arch., M.Arch. (Detroit) O.A.A.

S. Fai, B.Arch. (Carleton), B.A., M.A. (Ottawa), M.R.A.I.C.

L. Fontein, B.Arch. (Toronto), M.Arch. (McGill), O.A.Q.

Benjamin Gianni, B.A. (Pennsylvania), M.Arch. (Yale)

C.C. Gordon, B.A. (Amherst), Ph.D. (North Carolina)

S.G. Haider, B.Sc. (West Pakistan), M.S., B.Arch., Ph.D. (Illinois)

M. Jemtrud, B.Arch. (Penn State), M.Arch. (McGill)

Paul Kariouk, B.Sc.Arch. (Univ. of Virginia), M.Arch. (Columbia)

Adjunct Research Professors
J.W. Archer, B.A. (McGill), B.Arch., M.A. (Carleton)

John Cook, Dip.Arch. (Cambridge), M.A. (Cambridge) O.A.A., O.A.Q., M.R.A.I.C.

B.M. Firestone, B.Eng. (McGill), M.Eng. (Univ. of New South Wales), Ph.D. (Australian Nat. Univ.)

Studies in Art and Culture

Geraldine Finn, B.A. (Keele), M.A. (McMaster), Ph.D. (Ottawa)

Art History

Michael Bell, B.A., M.A. (Toronto)

A.K. Carr, LL.B. (York), B.A., M.A., Phil.M., Ph.D. (Toronto)

K.J. Crossman, B.A. (Winnipeg), M.A. (Toronto), Ph.D. (Edinburgh)

Randi Klebanoff, B.A. (Concordia), M.A. (British Columbia), Ph.D. (Harvard)

Roger Mesley, B.A., M.A., Ph.D. (Toronto)

C. Payne, B.F.A. (York), M.A., Ph.D. (Boston)

Adjunct Research Professors
Christina Cameron, B.A. (Toronto), M.A. (Brown), Ph.D. (Laval)

Stephen Inglis, B.A. (British Columbia), M.A. (Calcutta), Ph.D. (British Columbia)

Lilly Koltun, B.A. (Toronto), M.A. (London)

M.E. Jackson, A.B., M.A., Ph.D. (Michigan)

Andrea Laforet, B.A., Ph.D. (British Columbia)

George MacDonald, B.A. (Toronto), Ph.D. (Yale)

G. McMaster, B.F.A. (Minneapolis), M.A. (Carleton)

D. Nemiroff, B.F.A., M.A. (Concordia)

Film Studies

C.G. Faulkner, B.A. (Sir George Williams), M.A. (Western)

Mark Langer, B.A. (Western), M.F.A., M.Phil. (Columbia)

A. Loiselle, B.A. (Québec à Montréal), M.A., Ph.D. (British Columbia)

L.U. Marks, B.A. (Swarthmore), M.A., Ph.D. (Rochester)

George McKnight, B.A. (British Columbia), M.A. (McMaster), Ph.D. (Toronto)

Charles O'Brien, B.A. (Nebraska), Ph.D. (Iowa)

Z.M. Pick, Licencès-Lettres, Maitrise, D.de 3e cycle, (Paris)

Adjunct Research Professors
Blaine Allen, B.A. (Queen's), M.A. (Northwestern), Ph.D. (Northwestern)

Peter Baxter, B.A. (Windsor), M.A. (Simon Fraser), Ph.D. (London)

Peter Harcourt, B.A., M.A. (Downing College), (Cambridge)

Deborah Knight, B.A., M.A. (Cdn. Studies), M.A. (Carleton), Ph.D. (Toronto)

Susan Lord, B.A. (Simon Fraser), M.A. (York), Ph.D. (York)

Music

P.R.T. Cardy, B.Mus. (Western Ontario), M.M.A., D.Mus. (McGill)

William Echard, B.A. (Western Ontario), M.A. (York), Ph.D. (York)

B.R. Gillingham, A.R.C.T., B.A., B.Mus. (British Columbia), M.Mus. (King's College), Ph.D. (Washington)

A.M. Gillmor, B.Mus., M.A. (Michigan), Ph.D. (Toronto)

Elaine Keillor, A.R.C.T., B.A., M.A., Ph.D. (Toronto)

John Shepherd, A.R.C.M., B.A., B.Mus. (Carleton), D.Phil. (York, U.K.), F.R.S.C.

Adjunct Research Professors
Paolo Bellomia, B.Mus. (Montreal), M.Mus. (Montreal), D.Mus. (Montreal)

Murray Dineen, B.Mus. (Alberta), M.A. (Victoria), Ph.D. (Columbia)

D.R. Gardner, B.Sc., Ph.D. (Southampton)

Helmut Kallmann, B.Mus. (Toronto)

Peter Wicke, Ph.D. (Humboldt University)

Biology

N. Cappuccino, A.B. (Brown Univ., Rhode Is.), Ph.D. (Cornell)

G.R. Carmody, A.B., Ph.D. (Columbia)

Nathalie Chaly, B.Sc., M.Sc. (Carleton), Ph.D. (Laval)

J. Cheetham, B.Sc., Ph.D. (McMaster)

Lenore Fahrig, B.Sc. (Queen's), M.Sc. (Carleton), Ph.D. (Toronto)

Mark Forbes, B.Sc. (Acadia), M.Sc. (Western Ontario), Ph.D. (Toronto)

K. Gilmour, B.Sc. (McMaster), Ph.D. (Cambridge)

H.F. Howden, B.A., M.S. (Maryland), Ph.D. (North Carolina) Professor Emeritus

V.N. Iyer, M.Sc., Ph.D. (Bombay), Professor Emeritus

Iain Lambert, B.Sc. (Guelph), Ph.D. (McMaster)

S.B. Peck, B.S. (Kentucky), M.S. (Northwestern), Ph.D. (Harvard)

John Sinclair, B.Sc., Dip. in Biophysics (Edinburgh), Ph.D. (East Anglia)

Myron Smith, B.Sc. (Alberta), M.Sc., Ph.D. (Toronto)

K.B. Storey, B.Sc. (Calgary), Ph.D. (British Columbia)

J.P. Vierula, B.Sc. (York), Ph.D. (Calgary)

P.J. Weatherhead, B.Sc. (Carleton), M.Sc., Ph.D. (Queen's)

R.C. Wyndham, B.Sc. (McMaster), M.Sc. (Guelph), Ph.D. (Calgary)

Adjunct Research Professors
S.P.J. Brooks, B.Sc., M.Sc. (Brock), Ph.D. (Michigan)

K. Freemark, B.Sc. (Queen's), Ph.D. (Carleton)

R.M. Fourney, B.Sc., M.Sc. (Queen's), Ph.D. (Memorial)

W.D. Gould, B.Sc. (Manitoba), M.Sc., Ph.D. (Alberta)

B.F. Johnson, B.Sc. (Penn State), M.Sc., Ph.D. California

B.L.A. Miki, B.Sc. (Toronto), Ph.D. (Carleton)

Pierre Mineau, B.Sc. (McGill), M.Sc., Ph.D. (Queen's)

V.L. Seligy, B.Sc., M.Sc., Ph.D. (Toronto)

P.R. Walker, B.Sc., Ph.D. (Sheffield)

Hiroshi Yamazaki, M.S. (Hokkaido), Ph.D. (Wisconsin)

Distinguished Research and Professor Emeritus
M.E. McCully, B.Sc., M.Sc. (Toronto), Ph.D. (Harvard)

Honorary Research Professors
M.J. Canny, M.A., Ph.D. (Cambridge)

D.M. Wood, B.A., M.A. (Toronto), Ph.D. (McMaster)

Business

A.J. Bailetti, B.Sc., (Univ. National de Ingenieria, Peru) M.B.A., Ph.D. (Cincinnati)

J.R. Callahan, B.Sc. (Carleton), M.A., Ph.D. (Toronto)

David Cray, B.A. (New College), M.S., Ph.D. (Wisconsin)

L.E. Duxbury, B.Sc., M.A.Sc., Ph.D. (Waterloo)

Lorraine Dyke, B.A. (Ottawa), M.B.A., Ph.D. (Queen's)

Donald Gerwin, B.S. (Carnegie-Mellon), M.S. (Case Western Reserve), Ph.D. (Carnegie-Mellon)

G. Grant, B.Sc., M.B.A., (Andrews), Ph.D. (London School of Economics)

G.H. Haines, Jr., S.B. (M.I.T.), M.S., Ph.D. (Carnegie Institute of Technology)

L.A. Heslop, B.H.Sc., M.Sc. (Guelph), Ph.D. (Western Ontario)

V.M. Jog, B.Eng. (Birla Institute), M.Eng., M.B.A., Ph.D. (McGill)

M.N. Kiggundu, B.A. (Makerere), M.B.A. (Alberta), Ph.D. (Toronto)

Uma Kumar, B.Sc. (Agra), M.Sc. (Kanpur), M.Sc. (Manitoba), Ph.D. (Kanpur)

Vinod Kumar, B.Sc. (Agra), B.Eng. (Roorkee,) M.Eng. (California, Berkeley), Ph.D. (Manitoba), P.Eng.

Ian Lee, B.A., M.A., Ph.D. (Carleton)

J.J. Madill, B.H.Ec., M.Sc. (Manitoba), Ph.D. (Western Ontario)

Wojciech Michalowski, M.Sc., Ph.D. (Central School of Planning and Statistics, Warsaw)

Siva Pal, B.E. (Burdwan), M.S. (Wayne State), M.A.Sc., Ph.D. (Waterloo), P.Eng.

Nicolas Papadopoulos, B.B.A. (Athens Graduate School of Economics and Business), M.B.A. (Washington State), D.B.A. (Athens)

A. Ramirez, B.Sc. (Instituto Technológico y de Estudios Superiores de Monterrey), M.Sc. (Syracuse), Ph.D., (Concordia)

A.L. Riding, B.Eng., M.Eng. (McGill), M.B.A. (Sir George Williams), Ph.D. (McGill)

D.R. Thomas, B.Sc. (Imperial College), M.Sc. (Carleton), Ph.D. (Imperial College)

Adjunct Research Professors
Christopher Higgins, B.Math., M.A. Math., Ph.D. (Waterloo)

I. Kaliszewski, M.Eng. (Technical Univ. of Warsaw), Ph.D., D.Sc. (Polish Academy of Sciences)

G. Kersten, M.A. , Ph.D. (Central School of Planning and Statistics, Warsaw)

S. Maguire, B.A. (Ottawa), M.A., Ph.D. (Queen's)

G.R. Mallory, B.Sc. (Bradford), M.A. (Leeds), Ph.D. (Bradford)

Darren Meister, B.A.Sc. (Waterloo), Cip. Comp. Sci. (Cambridge), M.A.Sc., Ph.D. (Waterloo)

L.K. Moffat, B.A. (Manitoba), M.A., Ph.D. (Cornell)

S.Y. Noronha, B.Tech. (Indian Institute of Technology), Ph.D. (Indian Institute of Science)

Barbara Orser, B.A. (Waterloo), M.B.A. (York), Ph.D. (Bradford)

Stan Szpakowicz, M.A.Math., Ph.D. (Warsaw)

Canadian Studies

Katherine Arnup, B.A. (Toronto), B.Ed., M.Ed. (O.I.S.E.), Ph.D. (Toronto)

Madeleine Dion Stout, B.N. (Lethbridge), M.A. (Carleton)

Stanley McMullin, B.A., M.A. (Carleton), Ph.D. (Dalhousie)

Pauline Rankin, B.A. (Toronto), M.A., Ph.D. (Carleton)

J. Smith, B.A. (Oberlin College), M.Arch. (Massachusetts Institute of Technology), O.A.A., M.R.A.I.C.

Adjunct Professors
J.B. Carroll, B.Arch. (North Carolina State), M.R.P. (North Carolina)

David Hawkes, B.A. (Saskatchewan), M.A. (Queen's)

Adjunct Research Professors
Pat Armstrong, B.A. (Toronto), M.A., Ph.D. (Carleton)

Rt. Honourable Joe Clark, B.A., M.A., LL.D. (Alberta)

Heather Menzies, B.A. (McGill)

J.E. Page, B.A., M.A. (Queen's)

Fellows
Richard T. Clippingdale, B.A., M.A., Ph.D. (Toronto)

H. Blair Neatby, B.A. (Saskatchewan), M.A. (Oxford), Ph.D. (Toronto), Professor Emeritus

Chemistry

J.W. ApSimon, B.Sc., Ph.D. (Liverpool), F.C.I.C.

A.D.O. Bawagan, B.Sc. (Philippines), M.Sc. Houston, Ph.D. (British Columbia)

G.W. Buchanan, B.Sc., Ph.D. (Western Ontario)

P.H. Buist, B.Sc., Ph.D. (McMaster)

R.C. Burk, B.Sc., M.Sc., Ph.D. (Carleton)

R.J. Crutchley, B.Sc. (Toronto), Ph.D. (York)

B.R. Hollebone, B.Sc. (Carleton), Ph.D. (London)

Peeter Kruus, B.Sc. (Toronto), Lic. Tech. (Denmark), Ph.D. (Toronto)

E.P.C. Lai, B.Sc., M.Phil. (Hong Kong), Ph.D. Florida, (Gainesville)

K.B. Storey, B.Sc. (Calgary), Ph.D. (British Columbia)

C.S. Tsai, B.Sc. (Taiwan), M.Sc., Ph.D. (Purdue)

Z.Y. Wang, B.Sc. (Peking), Ph.D. (McGill)

D.C. Wigfield, B.Sc., D.Sc. (Birmingham), Ph.D. (Toronto)

J.S. Wright, B.Sc. (Stanford), Ph.D. (California, Berkeley)

Distinguished Research Professor
C.L. Chakrabarti, B.Sc. (Calcutta), M.Sc. (Birmingham), Ph.D., D.Sc., (Belfast), C.Chem., (U.K.), F.C.I.C.

Adjunct Research Professors
M.H. Back, B.Sc. (Acadia), M.Sc., Ph.D. (McGill)

E. Dabek-Zlotorzynska, M.Sc., Ph.D. (Warsaw)

N. De Silva, Ph.D. (Dalhousie)

G. DiLabio, B.Sc., M.Sc. (Carleton), Ph.D. (Clarkson)

M.F. Fingas, B.A. (Concordia Senior College), B.Sc. (Alberta) M.A., M.Sc. (Ottawa), Ph.D. (McGill)

D.C. Gregoire, M.Sc. (New Hampshire), M.Sc. (Manitoba), Ph.D. (Carleton)

K.U. Ingold, B.Sc. (London), D.Phil. (Oxford)

J.F. Lawrence, B.Sc., Ph.D. (Dalhousie)

L. MacGillivray, B.Sc. (St. Mary's), Ph.D. (Missouri)

R.J. Norstrom, B.Sc., Ph.D. (Alberta)

J.A. Ripmeester, B.Sc., Ph.D. (British Columbia)

K.W.M. Siu, B.Sc. (Hong Kong), M.Sc. (Birmingham), Ph.D. (Dalhousie)

R.E. Sturgeon, B.Sc., Ph.D. (Carleton)

D. Wayner, B.Sc. (McMaster), Ph.D. (Dalhousie)

Civil and Environmental Engineering

A.O. Abd El Halim, B.Sc. (Alexandria), M.A.Sc. (Toronto), Ph.D. (Waterloo), F.C.S.C.E, P. Eng.

Pascale Champagne, B.Sc. (McGill), B.Eng. (Guelph), M.Eng. (Carleton), Ph.D. (Carleton)

E.I.T.G.V. Hadjisophocleous, B.Sc., M.Sc., Ph.D. (New Brunswick), P.Eng.

G.A. Hartley, B.Eng., M.Eng. (Carleton), Ph.D. (Waterloo), P. Eng.

Yasser Hassan, B.Sc., M.Sc., (Cairo), Ph.D. (Carleton)

N.M. Holtz, B.Sc. (Alberta), M.Eng. (Technical University of Nova Scotia), Ph.D. (Carnegie-Mellon)

J.L. Humar, B.Sc. (Banaras), M.Tech. (I.I.T), Ph.D. (Carleton), F.C.S.C.E, F.E.I.C., P.Eng.

Deniz Karman, B.Sc. (Middle East Technical), M.Sc. Ege, (Turkey), Ph.D. (New Brunswick), P.Eng.

A.M. Khan, B.Eng., M.Eng. (American University of Beirut), Ph.D. (Waterloo), F.C.S.C.E., P. Eng.

H.A. Khoo, B.Sc., M.Sc., Ph.D. (Alberta), P.Eng.

D.T. Lau, B.Eng. (McMaster), M.Sc., Ph.D. (California, Berkeley), P.Eng.

K.T. Law, B.Sc., M.Sc. (Hong Kong), Ph.D. (Western Ontario), F.E.I.C., F.H. K.I.E., P. Eng.

W.J. Parker, B.A.Sc., M.A.Sc., Ph.D. (Waterloo), P.Eng.

A.G. Razaqpur, B.Sc. (American University of Beirut), M.Sc. (Hawaii), Ph.D. (Calgary), F.C.S.C.E., P. Eng.

J.J. Salinas, Ing. Civil Monterrey, M.Sc. (Illinois), Ph.D. (Calgary), P. Eng.

Siva Sivathayalan, B.Sc., Engineering (Univ. of Peradenjiya, Sri Lanka), M.A.Sc., Ph.D. (British Columbia)

T.S. Sridhar, B.Tech., M.Tech. (IIT), Ph.D. (New Brunswick), P.Eng.

P.J. Van Geel, B.A.Sc., Ph.D. (Waterloo), P.Eng.

Adjunct Research Professors
A.A.Y. Al Bakri, B.Sc., M.S., Ph.D. (Univ. of Iowa), M.S. (Yarmouk Univ., Ibrid, Jordan)

G.E. Bauer, B.A.Sc. (Toronto), M.A.Sc. (Waterloo), Ph.D. (Ottawa), F.E.I.C., P. Eng. D.W.R. Bell, B.A.Sc., M.A.Sc., (Toronto), P.h.D. (Carleton)

Mark Bomberg, M.Sc. , D.Sc. (Warsaw Technical Univ.), D. of Technology (Lund Univ., Sweden), P.Eng.

M.S. Cheung, B.Sc. (Chu Hai College), (Hong Kong), M.Sc., Ph.D. (Calgary), P.Eng.

S.E. Chidiac, B.Eng., M.Eng., Ph.D. (McMaster)

S.M. Easa, B.Sc. (Cairo), M.Eng. (McMaster), Ph.D. (California, Berkeley), P.Eng.

G.Y. Felio, B.A.Sc. (Ottawa), M.Eng. (Carleton), Ph.D. (Texas), P. Eng.

L.A. Graham, B.Sc. (McGill), M.Sc. (Carleton)

W.F. Johnson, B.Sc. (Toronto), S.M., Sc.D. (M.I.T.)

J.R. Mehaffey, B.Sc. (York), M.Eng., Ph.D. (Toronto)

E.H.H. Mohamed, B.Sc. (Khartoum), M.S.CE. (West Virginia State), Ph.D. (Carleton)

B.N. Persaud, B.S. (Iowa State), M.Eng., Ph.D. (Toronto), P.Eng.

A.P.S. Selvadurai, Dipl. Eng. (Brighton Polytechnic), D.I.C. (Imperial College, London), M.S. (Stanford), Ph.D., D.Sc. (Nottingham), F.I. Math. A., F.E.I.C., F.C.S.C.E., P.Eng.

L.A.Y. Shallal, B.Sc. (Al-Hikma), M.Sc. (Wayne State), Ph.D. (Carleton), P.Eng.

Yvan Soucy, B.Eng. (École Polytechnique), M.A.Sc. (Sherbrooke), Ph.D. (Carleton)

G.T. Suter, B.Eng. Sc. (Western Ontario), M.A.Sc., Ph.D. (Toronto), P.Eng.

O.J. Svec, M.Eng. (Technical University of Bratislava), Ph.D. (Waterloo), P. Eng.

Mostafa Warith, B.Sc. (Cairo), M.Sc. Ain Shams, M.Eng., Ph.D. (McGill)

Cognitive Science

Adjunct Research Professors
M.C. Clarke, B.A. (Western Ontario), M.A. (Dalhousie), Ph.D. (Western Ontario)

B. Emond, B.A., M.A. (Montréal), Ph.D. (McGill)

H. Goodluck, Ph.D. (Univ. Of Massachusetts, Amherst)

S. Marsh, B.Sc., Ph.D. (Univ. of Stirling)

S. Matwin, M.Sc., Ph.D. (Warsaw)

J. F. Meech, B.Sc., M.Sc. (Univ. of Manchester)

M. Montminy, B.Sc., M.Sc. (Laval), Ph.D. (Montreal)

C. Reiss, B.A. (Swarthmore), M.A., Ph.D. (Harvard)

D. Skuce, B.Eng. (Miami), M.Eng., Ph.D. (McGill)

S. Szpakowicz, M.Sc., Ph.D. (Warsaw)

A. Vellino, B.Sc. (King's College, London), M.Sc. (London School of Economics), Ph.D. (Toronto)

Comparative Studies in Literature, Art and Culture

J. Chevalier, B.Ph. (Ottawa), B.A. (Carleton), Ph.D. (Edinburgh)

C.G. Faulkner, B.A. (Sir George Williams), M.A. (Western Ontario)

Barbara Gabriel, B.A. (Manitoba), M.A. (Minnesota), Ph.D. (London)

B. Greenspan, B.A., M.A. (Western Ontario), Ph.D. (Toronto)

Albert Halsall, B.A. (Liverpool), M.A. (McMaster), Ph.D. (St. Andrews)

J.J. Healy, B.A., M.A. (Leeds), Ph.D. (Texas)

Francisco Hernández, Lic.Fa.y Letras (Barcelona), M.A., Ph.D. (Toronto)

P. Keen, B.A. (Dalhousie), M.A. (St. Andrews), M.A. (British Columbia), Ph.D. (York, UK)

Barbara Leckie, B.A. (Toronto), M.A., Ph.D. (McGill)

F.G. Loriggio, B.A. (British Columbia), M.A., Ph.D. (California, Los Angeles)

John Shepherd, B.A. (Carleton), A.R.C.M. (Royal College of Music), B.Mus. (Carleton), D.Phil. (York, U.K.), F.R.S.C.

P. Smart, B.A. (Toronto), M.A. (Laval), Ph.D. (Queen's)

G.A. Woods, Ph.D. (British Columbia)

Adjunct Research Professors
J. Bessiere, Docteur d'État (Sorbonne)

M. A. Giella, B.A. (Carleton), M.A. (Middlebury), Ph.D. (Laval)

R. Larson, B.A., M.A., Ph.D. (Toronto)

C. Marsden, B.A., M.A., Ph.D. (Cambridge)

R. Polzin, B.A. (San Diego), Ph.D. (Harvard)

Augusto Ponzio, Ph.D. (Bari)

P. Roster, B.A., M.A., Ph.D. (Rutgers)

R.B. Rutland, B.A. (Toronto), M.A., Ph.D. (London)

A.T. Tolley, B.A. (Oxford), F.R.S.L.

Computer Science

Michel Barbeau, B.C.S. (Sherbrooke), M.C.S., Ph.D. (Montreal)

S. Beauchemin, S.S., Ph.D. (Western Ontario)

P.K. Bose, B.Math, M.Math. (Waterloo), Ph.D. (McGill)

J.-P. Corriveau, B.Sc., M.C.S. (Ottawa), Ph.D. (Toronto)

S.P. Dandamudi, B.E. (Mysore), M.Tech. I.I.T., M.Sc., Ph.D. (Saskatchewan)

Frank Dehne, Dipl. Inform. Aachen, Ph.D. (Würzburg)

D. Deugo, B.C.S., M.C.S., Ph.D. (Carleton)

Douglas Howe, B.A. (Carleton), M.S., Ph.D. (Cornell)

Evangelos Kranakis, B.Sc. (Athens), Ph.D. (Minnesota)

Daniel Krizanc, B.Sc. (Toronto), Ph.D. (Harvard)

W.R. LaLonde, B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Waterloo)

Anil Maheswari, B.Eng., M.Sc. (Birla), Ph.D. (Bombay)

S. Naik, B.S. (Sambalpur, India), M.Tech. (IIT Kharagpur, India), M.Math. (Waterloo), Ph.D. (Concordia)

J.B. Oommen, B.Tech. I.I.T., M.Eng. (Indian Inst. of Science), M.Sc., Ph.D. (Purdue)

Franz Oppacher, M.C.S. (Concordia), Ph.D. (Vienna)

E. J. Otoo, B.Sc. (Kumasi, Ghana), M.Sc. (Newcastle-upon-Tyne), Ph.D. (McGill)

J.-R. Sack, Vordiplom, Diplom. (Bonn), Ph.D. (McGill)

Nicola Santoro, D.SC. (Pisa), Ph.D. (Waterloo)

Michael Weiss, M.S. (Tech U., Munich), Ph.D. (Mannheim)

Adjunct Research Professors
J. Czyzowizc, M.Sc., Ph.D. (Warsaw)

P. Flocchini, Maturita Scientifica, Laurea Degree, Ph.D. (Milan)

Amiya Nayak, B. Math. (Waterloo), M.C.S., Ph.D. (Carleton)

J.E. Neilson, B.Sc. (Manitoba), Ph.D. (British Columbia)

Andrzej Pelc, M.Sc., Ph.D. (Warsaw)

J.R. Pugh, B.Sc., M.Sc. (Swansea)

G. Ravindran, B.E., M.E. (Anna University, India) Ph.D. (Toronto)

Gerhard Roth, B.Math (Waterloo), M.C.S. (Carleton), Ph.D. (McGill)

D.A. Thomas, B.Eng., M.Eng. (Carleton)

P.C. van Oorschot, B.Math., M.Math., Ph.D. (Waterloo)

Earth Sciences

G.M. Atkinson, B.Sc. (Carleton), M.Sc., Ph.D. (Western)

John Blenkinsop, B.Sc., M.Sc., Ph.D. (British Columbia)

R.L. Brown, B.Sc. (McGill), Ph.D. (Edinburgh)

S.D. Carr, B.Sc. (Calgary), M.Sc., Ph.D. (Carleton)

G.R. Dix, B.Sc. (Queen's), M.Sc. (Memorial), Ph.D. (Syracuse)

F.A. Michel, B.Sc. (Queen's), M.Sc., Ph.D. (Waterloo)

R.T. Patterson, B.A., B.Sc. (Dalhousie), Ph.D. (California, Los Angeles)

Giorgio Ranalli, D. Geol. (Rome), M.S., Ph.D. (Illinois)

C.J. Schroder-Adams, B.Sc. (Technical University, Munich), M.Sc. (Christian-Albrechts, Kiel), Ph.D. (Dalhousie)

G.B. Skippen, M.Sc. (McMaster), Ph.D. (Johns Hopkins)

R.P. Taylor, B.Sc., Ph.D. (Leicester)

D.H. Watkinson, B.Sc., M.Sc. (McMaster), Ph.D. (Pennsylvania State)

Adjunct Research Professors
I.A. Beresnev, M.Sc., Ph.D. (Moscow)

R.G. Berman, B.A. (Amherst College), M.Sc., Ph.D. (British Columbia)

M. Caldwell, B.Sc. (Alberta), Ph.D. (McGill)

B.L. Cousens, B.Sc. (McGill), M.Sc. (British Columbia), Ph.D. (California, Santa Barbara)

S. Cumbaa, B.A., M.A., Ph.D. (Florida)

J.A. Donaldson, B.Sc. (Queen's), Ph.D. (Johns Hopkins)

H.J. Gibson, B.Sc. (Queen's), M.Sc., Ph.D. (Carleton)

S.K. Hanmer, B.Sc. (Wales), Ph.D. (London)

M.D. Hannington, B.Sc. (Queen's), M.Sc., Ph.D. (Toronto)

Jarmila Kukalova-Peck, M.Sc., Ph.D. (Charles)

D.A. Leckie, B.Sc. (Alberta), M.Sc., Ph.D. (McMaster)

R.H. Rainbird, B.Sc., M.Sc. (Carleton), Ph.D. (Western)

R. Stern, B.Sc. (Waterloo), Ph.D. (SUNY)

Economics

A.L.K. Acheson, B.A., Ph.D. (Toronto)

K.G. Armstrong, B.Sc. (Toronto), M.A., Ph.D. (British Columbia)

J.I. Bernstein, B.A. (Sir George Williams), M.A., Ph.D. (Western Ontario)

R.A. Brecher, B.A. (McGill), M.A., Ph.D. (Harvard)

R.L. Carson, M.A. (Minnesota), Ph.D. (Indiana)

Zhiqi Chen, B.A. (Nanjing), M.A. (Carleton), Ph.D. (Western Ontario)

E.U. Choudhri, M.A. (Punjab), Ph.D. (Chicago)

V.H. Dehejia, B.A. (Carleton), A.M., M.Phil., Ph.D. (Columbia)

F.S. Demers, B.A. (Bogaziçi), M.B.A. (McGill), M.A., Ph.D. (Johns Hopkins)

Michel Demers, B.A., M.A. (McGill), M.A., Ph.D. (Johns Hopkins)

J.S. Ferris, B.Com., M.A. (Toronto), Ph.D. (California, Los Angeles)

Kanta Marwah, M.A. (Punjab), Ph.D. (Pennsylvania)

D.G. McFetridge, B.Com. (Saskatchewan), M.A. (Toronto), M.Sc. (London), Ph.D. (Toronto)

S.B. Park, M.Eco. (Seoul), M.A., Ph.D. (Indiana)

Simon Power, B.A. (Durham), M.A. (London) and (Saskatchewan), Ph.D. (Western Ontario)

A.R.M. Ritter, B.A. (Queen's), M.A. (Western Ontario), Ph.D. (Texas)

P.N. Rowe, B.A. (Stirling), M.A., Ph.D. (Western Ontario)

Huntley Schaller, B.A. (McGill), Ph.D. (M.I.T.)

D.A. Smith, B.Com., M.A. (Toronto), Ph.D. (M.I.T.)

Stanley Winer, B.A. (Carleton), M.A., Ph.D. (Johns Hopkins)

F.W. Woolley, B.A. (Simon Fraser), M.A. (Queen's), Ph.D. (London)

Christopher Worswick, B.A. (Queen's), M.A., Ph.D. (British Columbia)

Jiankang Zhang, B.S. (Zheng Zhou University), M.S. (Northern Jiaotong University), M.A. (Windsor), Ph.D. (Toronto)

Distinguished Research Professors
C.J. Maule, B.A. (British Columbia), M.A. (Queen's), Ph.D. (London)

C.H. McMillan, Jr., M.A. (Yale), Ph.D. (Johns Hopkins)

T.K. Rymes, B.A. (Manitoba), M.A., Ph.D. (McGill)

Adjunct Research Professors
J.R. Baldwin, B.A. (Queen's), Ph.D. (Harvard)

M. Corak, B.A., M.A. (McGill), Ph.D. (Queen's)

H.E. English, B.A. (British Columbia), Ph.D. (California)

L.L. Schembri, B.Com. (Toronto), M.Sc. (London), Ph.D. (M.I.T.)

Electronics

R. Achar, M. Eng. (BITS - Pilani, India), Ph.D. (Carleton)

C.H. Chan, B.Sc. (Taiwan), M.A.Sc., Ph.D. (Waterloo), P. Eng.

R. Gauthier, B.Sc. (Laurentian), M.Sc., Ph.D. (Dalhousie)

T.A. Kwasniewski, M.Sc., Ph.D. (Warsaw), P. Eng.

R. Mason, B.Sc. (St. Francis Xavier), M.Eng. (Carleton), Ph.D. (Technical University of Nova Scotia)

M.S. Nakhla, B.Sc. (Cairo), M.Sc., Ph.D. (Waterloo)

Calvin Plett, B.A.Sc. (Waterloo), M.Eng., Ph.D. (Carleton)

L. Roy, B.A.Sc. (Waterloo), M.Eng., Ph.D. (Carleton)

M. Shams, B.Sc. (Kuwait), M.A.Sc., Ph.D (Waterloo)

T.J. Smy, B.Sc., Ph.D. (Alberta)

B.A. Syrett, B.Eng., M.Eng. (Carleton), Ph.D. (Alberta), P.Eng.

N. Tait, B.Sc. (Alberta), M.A.Sc. (British Columbia), Ph.D. (Alberta)

N.G. Tarr, B.Sc., Ph.D. (British Columbia), P. Eng.

D.J. Walkey, B.Sc., Ph.D. (Calgary), P. Eng.

J.S. Wight, B.Sc. (Calgary), M.Eng., Ph.D. (Carleton), P.Eng.

Q.J. Zhang, B.Eng. (East China Engineering Institute), Ph.D. (McMaster)

Distinguished Research Professors
A.R. Boothroyd, B.Sc.Eng., Ph.D. (London), F.I.E.E.E., Professor Emeritus

M.A. Copeland, B.Sc. (Manitoba), M.A.Sc., Ph.D. (Toronto), F.I.E.E.E., P.Eng., Professor Emeritus

Adjunct Research Professors
S. Charbonneau, B.Sc., M.Sc. (Ottawa), Ph.D. (Simon Fraser)

S. Fafard, B.Sc., M.Sc., Ph.D. (Ottawa)

R.G. Harrison, B.A., M.A. (Cambridge), D.I.C. (Imperial), Ph.D. (London)

J-J. He, B.Eng. (Zheijiang University), M.Sci., Ph.D. (University of Paris VI)

S. Janz, B.Sc., M.Sc., Ph.D. (Toronto)

J.P. Knight, B.Sc. (Queen's), M.A.Sc., Ph.D. (Toronto)

B. Lamontagne, B.Eng., M.Sc.A., Ph.D. (École Polytechnique, Montreal)

S.P. McAlister, B.Sc., M.Sc. (Natal), Ph.D. (Cambridge)

A. Petosa, B.Eng., M.Eng., Ph.D. (Carleton)

M.G. Stubbs, B.Eng., M.Eng., Ph.D. (Sheffield)

Valek Szwarc, B.Eng. (McGill), M.Sc., Ph.D. (Connecticut)

R.E. Thomas, B.Sc. (New Brunswick), D.I.C. (Imperial), Ph.D. (London), P.Eng.

English

D.A. Beecher, M.A. (California), Ph.D. (Birmingham)

S. Bly, B.A. (McGill), M.A. (Queen's), Ph.D. (Notre Dame)

A. Bohm, B.A. (Alberta), M.A. (Alberta), Ph.D. (Johns Hopkins)

Brenda Carr, B.A. (Evangel College), M.A. (Northwestern), Ph.D. (Western Ontario)

H.P. Duchemin, B.A., M.A. (Toronto), Ph.D. (London)

M.J. Edwards, B.A. (Toronto), M.A. (Queen's), Ph.D. (Toronto)

Barbara Gabriel, B.A. (Manitoba), M.A. Minnesota, Ph.D. (London)

B. Garner, B.A. (New Brunswick), M.A. (Toronto), Ph.D. (London)

L. Groeneveld, B.A. (Alberta), Ph.D. (Alberta)

B. Greenspan, B.A., M.A. (Western Ontario), Ph.D. (Toronto)

J.J. Healy, M.A. (Leeds), Ph.D. (Texas)

R. Hogg, B.A. (British Columbia), Ph.D. (State Univ. of New York at Buffalo)

R. Holton, B.A. (St. Mary's), M.A. (London), Ph.D. (McGill)

P. Keen, B.A. (St. Andrew's), M.A. (British Columbia), Ph.D. (York)

Barbara Leckie, B.A. (Toronto), M.A., Ph.D. (McGill)

L.T.R. McDonald, B.A. (Royal Military College), M.A. (Carleton), Ph.D. (Queen's)

J. Medd, B.A. (Queen's), M.A. (Cornell), Ph.D. (Cornell)

E.D. Padolsky, B.A. (Manitoba), M.A., Ph.D. (California)

P.L. Walton, Ph.D. (Toronto)

M. White, B.A. (Toronto), M.A. (Ottawa), Ph.D. (Loyola)

Adjunct Professor
James Noonan, B.A. (St. Patricks), M.A. (Cambridge), S.T.L. (Ottawa)

Adjunct Research Professors
John Flood, M.A. (Calgary), Ph.D. (Toronto)

Michael Gnarowski, B.A. (McGill), M.A. (Montréal), Ph.D. (Ottawa)

T.J. Henighan, B.A. (St. John's, N.Y.), M.Litt, Ph.D. (Durham)

J.H.C. Reid, B.A. (Carleton), B.Ed. (Queen's), Ph.D. (London)

R.B. Rutland, B.A. (Toronto), M.A., Ph.D. (London)

James Steele, M.A. (Toronto), Ph.D. (London)

D.J. Wurtele, B.A. (London), M.A., Ph.D. (McGill)

European and Russian Studies

Joan DeBardeleben, B.A., M.A., Ph.D. (Wisconsin, Madison)

Distinguished Research Professor
C. MacMillan Jr., M.A. (Yale), Ph.D. (Johns Hopkins)

Adjunct Professor
Basil F. Mogridge, B.A., Ph.D. (Cambridge)

Adjunct Research Professors
E. Apel, B.A. (Pennsylvania), M.A., Ph.D. (Harvard)

M.J. Carley, Ph.D. (Queen's)

J.D. Clayton, B.A. (Cambridge), A.M., Ph.D. (Illinois)

Hanna Diskin, Ph.D. (Tel Aviv)

Andrew Donskov, Ph.D. (Helsinki)

J.K. Fedorowicz, Ph.D. (Cambridge)

John Fraser, M.A. (Oxford)

P. Konechy, B.A. (Toronto), M.A. (Carleton), Ph.D. (Toronto)

E. Kranakis, B.A. (Luther College), Ph.D. (Minnesota)

J.K. Laux, B.A. (Cornell), M.A. (Johns Hopkins), Ph.D. (London School of Economics and Political Science)

Maria Los, Ph.D. (Warsaw)

Magdalena Opalski, Ph.D. (Ottawa)

Peter Roberts, M.A. (Alberta)

R. Sokoloski, B.A. (McMaster), M.A., Ph.D. (Toronto)

French

Charles Doutrelepont, B.A., M.A., Ph.D. (Montréal)

Robert Fournier, B.A., M.A. (Québec à Montréal), Ph.D. (Sherbrooke)

A.W. Halsall, B.A. (Liverpool), M.A. (McMaster), Ph.D. (St. Andrews)

M.-O. Junker, M.A. (Strasbourg), Ph.D. (Sherbrooke)

Sinclair Robinson, B.A. (Western Ontario), M.A. (Rochester)

Dominique Rosse, L. ès L. (Reims), M.A., Ph.D. (Ottawa)

Alvina Ruprecht, B.A. (Carleton), M.A. (McGill), Ph.D. (Ottawa)

H.-G. Ruprecht, D.Phil. (Saabrucken), Diplome E.H.E.S.S. (Paris)

Patricia Smart, B.A. (Toronto), M.A. (Laval), Ph.D. (Queen's), F.R.S.C.

D.W. Smith, B.A. (York), M. ès L. (Paris), Ph.D. (Ottawa)

J.-J. Van Vlasselaer, Cert. Paed. (Antwerpen), M.A. (Ottawa)

Evelyne Voldeng, B.A., M.A., D. de 3e cycle, (Aix-en-Provence), D. d'État ès L. (Sorbonne)

Adjunct Professors
Odette Condemine, B.A. (St. Patrick's), M.A., Ph.D. (Ottawa)

P.M. Van Rutten, Diplome de Prof. de Français, (Sorbonne), Ph.D. (Ottawa)

Adjunct Research Professors
André Elbaz, C.A.P. (Paris), L. ès L (Bordeaux), C.A.P.E.S., D.d'Univ. (Sorbonne)

Michel Gaulin, B.A. (Ottawa), M.A. (Montréal), Ph.D. (Harvard)

Pierre Laurette, L. ès L. (Lille), D.E.S., D.Phil. (Saarbrücken), D. d'Univ. (Strasbourg), D. d'État ès L. (Paris)

E. N. Zimmerman, B.A. (Barnard), M.A., Ph.D. (Wisconsin)

Geography

David Bennett, B.A., Ph.D. (Liverpool)

M.J. Brklacich, B.Sc. (Trent), M.A. (Guelph), Ph.D. (Waterloo)

C.R. Burn, B.Sc. (Durham), M.A., Ph.D. (Carleton)

John Clarke, B.A. (Queen's), (Belfast), M.A. (Manitoba), Ph.D. (Western Ontario)

Simon Dalby, B.A. (Dublin), M.A. (Victoria), Ph.D. (Simon Fraser)

Nancy Doubleday, B.Sc. (Brock), B.Ed. (Toronto), L.L.B. (York), M.E.S. (York), Ph.D. (Queen's), Member Bar of Ontario

M.F. Fox, B.A. (Sheffield), M.A. (Carleton)

D.J. King, B.A.Sc., M.Sc.F., Ph.D. (Toronto)

Fran Klodawsky, B.A. (Toronto), M.A. Ohio State, Ph.D. (Queen's)

Joyce Lundberg, B.Sc. (Dublin), M.Sc. (Australian National), Ph.D. (McMaster)

A.F.D. Mackenzie, B.A. (London), M.A. (Carleton), Ph.D. (Ottawa)

M.W. Smith, B.Sc. (Liverpool), M.A. (Georgia), Ph.D. (British Columbia)

D.R.F. Taylor, M.A. (Edinburgh), P.G.C.E. (London), Ph.D. (Edinburgh)

J.K. Torrance, B.S.A. (Guelph), M.S., Ph.D. (Cornell)

J.E. Tunbridge, B.A., M.A. (Cambridge), Ph.D. (Bristol)

A.I. Wallace, B.A., D. Phil. (Oxford)

Adjunct Research Professors
F. Ahern, A.B. (Cornell), Ph.D. (Maryland)

R. D. Bollman, B.Sc., M.Sc. (Manitoba), Ph.D. (Toronto)

J.D. Ives, B.A. (Nottingham), Ph.D. (McGill)

V.M. Jefremovas, B.A. (York), M.A. (Toronto), Ph.D. (Toronto)

V.A. Konrad, B.A., M.A. (York), Ph.D. (McMaster)

E.W. Manning, B.A., M.A. (British Columbia)

E.J. Marshall, B.A. (McGill), M.A. (Toronto), Ph.D. (McGill)

Andrew Rencz, B.Sc. (Alberta), M.Sc. (McGill), Ph.D. (New Brunswick)

J. M. Schwartz, B.A. (Toronto), M.A. (British Columbia), Ph.D. (Queen's)

E. Siekierska, M.Sc. (Warsaw), Ph.D. (Swiss Federal Institute of Technology)

Aron Spector, B.A. (Toronto), M.A., Ph.D. (Ohio State)

T.L. White, Dipl. Eng. Geol. (Sir Sandford Fleming), B.E.S. (Waterloo), B.A., M.Sc., Ph.D. (Carleton)

History

K.M. Abel, B.A. (Queen's), M.A. (Manitoba), Ph.D. (Queen's)

M.J. Barber, B.A., M.A. (Queen's), Ph.D. (London)

J.G. Bellamy, B.A. (Oxford), M.A. (Oxford and Nottingham), Ph.D. (Nottingham) Professor Emeritus

Y.A. Bennett, B.A., M.A. (Windsor), Ph.D. (McMaster)

J.L. Black, B.A. (Mount Allison), M.A. (Boston), Ph.D. (McGill), Professor Emeritus

R.C. Blockley, B.A. (Leicester), M.A. (McMaster), Ph.D. (Nottingham)

D.M. Dean, B.A., M.A. (Auckland), Ph.D. (Cambridge), F.R.Hist.S.

B.S. Elliott, B.A. (Carleton), M.A. (Leicester), Ph.D. (Carleton)

R.C. Elwood, B.A. (Dartmouth), M.A., Ph.D. (Columbia)

D.M.L. Farr, B.A. (British Columbia), M.A. (Toronto), D. Phil. (Oxford), Professor Emeritus

E.P. Fitzgerald, B.A. (Seton Hall), M.A., Ph.D. (Yale)

R. B. Goheen, B.A. (Toronto), M.A., Ph.D. (Yale)

G.F. Goodwin, B.A. (Virginia), Ph.D. (Princeton)

Deborah Gorham, B.A. (McGill), M.A. (Wisconsin), Ph.D. (Ottawa)

N.E.S. Griffiths, B.A. (London), M.A. (New Brunswick), Ph.D. (London), Doct. d'Hist. (Université de Moncton), Doct. d'Hist., (Ste-Anne, N.S.), Doc. Hum. Lett. (Mount St. Vincent), F.R.S.C., Professor Emeritus

G.N. Hillmer, B.A., M.A. (Toronto), Ph.D. (Cambridge)

J.K. Johnson, B.A., M.A. (Toronto), Professor Emeritus

Jacob Kovalio, B.A. (Tel-Aviv), M.A., Ph.D. (Pittsburgh)

W.R. Laird, B.A. (Concordia), M.A., Ph.D. (Toronto)

Sonya Lipsett-Rivera, B.A. (Ottawa), M.A., Ph.D. (Tulane)

Dominique Marshall, B.A., M.A., Ph.D. (Montréal)

D.L. McDowall, B.A., M.A. (Queen's), Ph.D. (Carleton)

A.B. McKillop, B.A., M.A. (Manitoba), Ph.D. (Queen's)

S.R. Mealing, B.A. (Alberta), B.Litt., M.A. (Oxford), Professor Emeritus

James D. Miller, B.A. (East Anglia), Ph.D. (Emory)

D.A. Muise, B.A. (St. Francis Xavier), M.A. (Carleton), Ph.D. (Western Ontario)

H.B. Neatby, B.A. (Saskatchewan), M.A. (Oxford), Ph.D. (Toronto), F.R.S.C., Professor Emeritus

Roderick Phillips, B.A. (Trent), M.A. (Otago), D.Phil. (Oxford)

M.J. Sydenham, B.A., Ph.D. (London), F.R.Hist.S., Professor Emeritus

F.A.J. Szabo, B.A. (Montréal), M.A., Ph.D. (Alberta)

J.H. Taylor, B.Sc. (Alberta), M.A. (British Columbia)

P.J. Walker, B.A. (Concordia), M.A. (York), Ph.D. (Rutgers)

S.B. Whitney, B.A. (Princeton), M.A. (Brown), Ph.D. (Rutgers)

S.F. Wise, C.M., B.A., B.L.S. (Toronto), M.A. (Queen's), LL.D. (Guelph), F.R.S.C., Professor Emeritus

Adjunct Research Professors
N.L. Adamson, B.A. (Mt. Holyoke), M.A. (Emory), Ph.D., B.Sc.N. (Toronto)

B.C. Bickerton, B.A., M.A. (Acadia)

J.F. Bosher, B.A. (British Columbia), Diplome d'études superieures (Université de Paris, Sorbonne), Ph.D. (London)

B. Boutilier, B.A. (Toronto), M.A., Ph.D. (Carleton)

R.T. Clippingdale, B.A., M.A., Ph.D. (Toronto)

V. Dickenson, B.A., M.A. (Toronto), Ph.D. (Carleton)

W.A.B. Douglas, B.A. (Toronto), M.A. (Dalhousie), Ph.D. (Queen's)

Toby Gelfand, B.S. (Ursinus College), Ph.D. (Johns Hopkins)

S.J. Harris, B.A., M.A. (McMaster), Ph.D. (Duke)

P.J. King, B.A., M.A. (Cambridge), A.M., Ph.D. (Illinois)

M.W. Labarge, B.A. (Radcliffe), B.Litt. (Oxford)

P.C. Merkley, B.A., M.A., Ph.D. (Toronto)

R.F. Sarty, B.A. (Toronto), M.A. (Duke), Ph.D. (Toronto)

J. Schwartz, B.A. (Toronto), M.A. (British Columbia), Ph.D. (Queen's)

J. Smart, B.A. (Toronto), M.A. (Carleton)

International Affairs

D.W. Carment, B.A., M.A. (McMaster), M.A. (Carleton), Ph.D. (McGill)

V.H. Dehejia, B.A., (Carleton), A.M., M.Phil., Ph.D. (Columbia)

F.O. Hampson, B.A. (Toronto), M.Sc. (London), Ph.D. (Harvard)

D.P. Long, B.A. (Keele), Ph.D. (London)

Ozay Mehmet, B.Sc. (London), M.A., Ph.D. (Toronto)

M.A. Molot, B.A., M.A. (McGill), Ph.D. (California, Berkeley)

A.R.M. Ritter, B.A. (Queen's), M.A. (Western Ontario), Ph.D. (Texas)

D.P. Rowlands, B.A. (Carleton), M.A. Ph.D. (Toronto)

Martin Rudner, B.A., M.A. (McGill), M.Litt. (Oxford), Ph.D. (Jerusalem)

D.R.F. Taylor, M.A. (Edinburgh), P.G.C.E. (London), Ph.D. (Edinburgh)

B.W. Tomlin, B.A. (McMaster), M.A., Ph.D. (York)

Distinguished Research Professors
C.J. Maule, B.A. (British Columbia), M.A. (Queen's), Ph.D. (London)

John O'Manique, B.Sc. (St. Patrick's College), Ph.L. (Ottawa), D. Phil. (St. Paul's)

Adjunct Research Professors
L.A.B. Eden, B.A. (Mount Allison), M.A. (McGill), Ph.D. (Dalhousie)

Jean Daudelin, B.A., M.A., Ph.D. (Laval)

Walter H. Dorn, B.Sc., M.Sc., Ph.D. (Toronto)

Stephen L. Harris, B.A. (Concordia), M.A. (Montreal), M.A., Ph.D. (Carleton)

D.M. Malone, B.A. (Montréal), M.P.A. (Harvard), D.Phil. (Oxford)

D. Oliver, B.A. (Memorial), M.S., Dip., Ph.D. (York)

Journalism and Communication

G.S. Adam, B.J., M.A. (Carleton), Ph.D. (Queen's)

Elly Alboim, B.A. (McGill), M.Sc. (Columbia)

Paul Attallah, B.A. (Ottawa), M.A., Ph.D. (McGill)

Roger Bird, B.A. (Carleton), M.A., Ph.D. (Minnesota)

Michael Dorland, B.A., M.A. (McGill), Ph.D. (Concordia)

C.T. Dornan, B.J. (Carleton), M.A. (Cambridge), Ph.D. (McGill)

Ross Eaman, B.A. (Carleton), M.A. (Toronto), Ph.D. (Queen's)

Barbara Freeman, B.J., M.A. (Carleton), Ph.D. (Concordia)

Peter Johansen, B.A. (Carleton), M.A. (Stanford)

K.H. Karim, B.A. (Columbia), M.A., Ph.D. (McGill)

Lionel Lumb

Michèle Martin, B.A. (Québec à Montréal), M.A. (Montréal), Ph.D. (Toronto)

Mary McGuire, B.J. (Carleton)

Catherine McKercher, B.A. (Carleton), M.J. (Temple)

Vincent Mosco, B.A. (Georgetown), Ph.D. (Harvard)

J. Neil, B.J. (Carleton)

Klaus Pohle, M.J. (Carleton)

D.B. Pottier, B.J., M.A. (Carleton)

E.M. Saunders, B.A. (St. Francis Xavier), M.A. (Queen's), Ph.D. (Carleton)

Lois Sweet, B.A. (Carleton)

David Tait, B.J., M.J. (Carleton)

D. Winseck, B.A., M.A. (Windsor), Ph.D. (Oregon)

Adjunct Research Professors
P. Calamai, B.Sc. (McMaster)

Clyde Sanger, M.A. (Oxford)

John Sawatsky, B.A. (Simon Fraser)

Adjunct Professors
A.J. Cordell, B.A. (McGill), M.A., Ph.D. (Cornell)

Leslie Regan Shade, B.A. (California at San Diego), M.L.S. (UCLA), Ph.D. (McGill)

D. Van Praagh, B.A. (Brandeis), M.S. (Columbia)

Law

R.L. Campbell, LL.B. (Western), LL.M. (London, of the Bar of Ontario)

P.J. Davidson, B. Eng. (Carleton), LL.B. (Ottawa), LL.M. (London, of the Bar) of Ontario

T.B. Dawson, LL.B. (Canterbury), LL.M. (Osgoode Hall, of the Bar of New Zealand)

D.W. Elliott, B.A. (British Columbia), M.A., D.Phil. (Oxford)

A.J. Hunt, B.A., LL.B., Ph.D. (Leeds)

M.J. Mac Neil, B.Sc., LL.B. (Dalhousie), LL.M. (Harvard)

Diana Majury, B.A. (Manitoba), LL.B. (Queen's), LL.M. S.J.D. (Wisconsin at Madison)

Maeve McMahon, B.Soc.Sc. (Dublin), M.A., Ph.D. (Toronto)

M.H. Ogilvie, B.A. (Toronto), LL.B. (Dalhousie), M.A., D.Phil. (Oxford), D.D. (Presbyterian College, Montréal), F.R.S.C., of the Bars of Nova Scotia and Ontario

O.C. Okafor, LL.B., LL.M. (Nigeria), LL.M., Ph.D. (British Columbia)

T. Purvis, B.P.A., M.A. (Carleton), Ph.D. (Lancaster)

R.P. Saunders, B.A., LL.B. (Dalhousie), LL.M. (London)

Peter Swan, B.A., LL.B. (Dalhousie), M.E.S., LL.M. (York)

Rosemary Warskett, B.A. (Queen's), M.A., Ph.D. (Carleton)

J.B. Wright, B.A. (Toronto), LL.B. (York), LL.M. (London), D. Jur. (York)

Adjunct Professor
P.J. Fitzgerald, B.A. (Oxford, of Lincolns Inn), Barrister at Law, of the Bar of Ontario

Adjunct Research Professors
S. Clark, B.A. (Carleton), Ph.D. (Edinburgh)

Christian Jaekl, M.A., Dr. Jur. (Vienna), Ph.D. (Dijon)

B.N. Leighton, B.A. (Victoria), Ph.D. (Toronto)

Maria Los, Ph.D. (Warsaw)

P. Reed, B.A. (York), M.A., Ph.D. (Toronto)

I. Zinger, B.A. (Carleton), LL.B. (Ottawa), Ph.D. (Carleton)

Linguistics and Applied Language Studies
P. Currie, B.A. (Queen's), Ph.D. (Lancaster)

Richard Darville, B.A. (Kansas), Ph.D. (British Columbia)

Aviva K. Freedman, B.A. (McGill), M.A. (Columbia), Ph.D. (Montréal)

Peter G. Medway, B.A., M.A. (Oxford), Ph.D. (Leeds)

Ian W.V. Pringle, M.A. (Auckland)

Jaromira Rakusan, M. Ling., Lit.Sci. (Charles, Prague), Ph.D. (Ottawa)

Hans-George Ruprecht, Dr. Phil. Saarbrücken, Diplôme E.H.E.S.S. (Paris)

R. Stainton, B.A. (York), Ph.D. (Massachusetts Institute of Technology)

Devon H. Woods, B.A. (Carleton), M.Sc. (Edinburgh), Ph.D. (Utrecht)

Lynne Young, B.A. (Carleton), M.A. (York), Ph.D. (Leuwen)

Helmut Zobl, B.A., M.A. (Toronto), Ph.D. (Essen)

Adjunct Professor
J.M. Yalden, B.A. (Toronto), M.A. (Michigan)

Mathematics and Statistics

David Amundsen, B.Sc., (British Columbia), Ph.D. (MIT)

Y. Billig, B.Sc., Ph.D. (Moscow State)

Amitava Bose, B.Sc., M.Sc. (McGill), Ph.D. (Carleton)

J.D. Dixon, M.A. (Melbourne), Ph.D. (McGill)

P. Farrell, B.Eng., M.Eng., M.B.A., Ph.D. (McGill)

Che-Kao Fong, B.Sc. (Chinese University of Hong Kong), M.Sc., Ph.D. (Toronto)

Zhicheng Gao, B.A. (Nanjing), Ph.D. (California, San Diego)

C.W.L. Garner, B.Sc. (New Brunswick), M.A., Ph.D. (Toronto)

Roger Herz-Fischler, B.Sc. (Polytechnic Institute of Brooklyn), M.A., Ph.D. (Oregon)

W. Jaworski, M.Sc., Ph.D. (N. Copernicus), Ph.D. (Queen's)

Sam Melkonian, B.Sc., M.Sc., Ph.D. (McGill)

S.E. Mills, B.Sc., M.Sc., Cert.Ed. (Manitoba), Ph.D. (Alberta)

A.B. Mingarelli, B.Sc. (Concordia), M.Sc., Ph.D. (Toronto)

M. Mojirsheibani, B.Sc., M.Sc., Ph.D. (Toronto)

B.C. Mortimer, B.Sc. (Carleton), M.Sc. (Alberta), Ph.D. (London).

Daniel Panario, B.Eng. (Republica), M.Appl.Math. (Sao Paolo), Ph.D. (Toronto)

J.N. Pandey, M.Sc. (Banaras Hindu), Ph.D. (New York)

J.C. Poland, M.Sc., Ph.D. (McGill)

I.S. Pressman, B.Sc. (Manitoba), Ph.D. (Cornell)

Luis Ribes, Licenciado en Matematics (Madrid), M.A., Ph.D. (Rochester), Doctor en Ciencias (Madrid)

Matias Salibian-Barrera, Ph.D. (British Columbia)

Brett Stevens, B.A. (Chicago), M.Sc., Ph.D. (Toronto)

Barbara Szyszkowicz, B.Sc., M.Sc. (Wroclaw), Ph.D. (Carleton)

Arthur Vartanian, B. Eng., M. Eng. (McGill), Ph.D. (Bourgogne) **K.S. Williams**, B.Sc. (Birmingham), M.A., Ph.D. (Toronto), D.Sc. (Birmingham)

Y. Zhao, B.S. (Nanjing), Ph.D. (Saskatchewan)

Professors Emeriti
Miklós Csörgó, B.A. (Budapest), M.A., Ph.D. (McGill), F.R.S.C.

D.A. Dawson, B.Sc., M.Sc. (McGill), Ph.D. (M.I.T.), F.R.S.C., Professor Emeritus

Vlastimil Dlab, RNDr., C.Sc. (Charles, Prague), Ph.D. (Khartoum), D.Sc (Charles), F.R.S.C.

M.S. Macphail, B.A. (Queen's), M.A. (McGill), D.Phil. (Oxford), D.Sc. (Carleton), F.R.S.C.

J.N.K. Rao, M.A. (Bombay), Ph.D. (Iowa State), F.R.S.C.

Distinguished Research Professors
E.O. Kreyszig, M.Sc., D.Sc. (Darmstadt)

Mizanur Rahman, M.Sc. (Dacca), M.A. (Cambridge), Ph.D. (New Brunswick)

A.K.Md. Ehsanes Saleh, M.Sc. (Dacca), M.A., Ph.D. (Western Ontario)

Adjunct Research Professors
Stephen J. Astels, M.Sc. (Acadia), M.Math, Ph.D. (Waterloo)

Nick Barrowman, B.Sc., M.Sc. (Queen's), Ph.D. (Dalhousie)

Kokou Dossou, M.Sc. (Bénin), M.Sc., Ph.D. (Laval)

Alexander Kitaev, M.Sc., Ph.D., (Leningrad)

Daniel Krewski, M.Sc., Ph.D. (Carleton)

I.A. Manji, B.Sc., M.Sc.,Ph.D. (Toronto)

Delfin Montano, B.Sc. (Manila), M.S. (Yamanashi), D.Inf.Eng. (Nagoya), Ph.D. (Toronto)

Pal Revesz, Ph.D. (Budapest)

A.R.B. Richter, B.Sc. (McGill), M.Sc., Ph.D. (Waterloo) Singh, B.Sc. (Banaras), M.Sc. (Carleton), Ph.D. (California, Berkeley)

Arthur Vartanian, B. Eng., M. Eng. (McGill), Ph.D. (Bourgogne)

Yong You, B.Sc. (Tianjin), M.A. (York), Ph.D. (Carleton)

Mechanical and Aerospace Engineering

F.F. Afagh, B.Sc., M.Sc. (Washington State), Ph.D. (Waterloo), P.Eng.

Andrei Artemev, M.Sc., Ph.D. (Moscow Institute of Steel and Alloys)

J.C. Beddoes, B.Eng., M.Eng., Ph.D. (Carleton), P.Eng.

Robert Bell, B.Sc., Ph.D. (Queen's), (Belfast), P.Eng.

M.J. Bibby, M.Sc., Ph.D. (Alberta), P.Eng.

D. Gauthier, B.Eng., M.Eng. (RMC), Ph.D. (Queen's)

J.A. Gaydos, B.A.Sc., M.A.Sc., Ph.D. (Toronto), P.Eng.

J.A. Goldak, B.Sc., M.Sc., Ph.D. (Alberta), P.Eng. , Professor Emeritus

T. Kaya, B.Sc., (ITU), M.Sc. (VKI), M.Sc. (METU), Master's (TAS), Ph.D. (ENSAE)

R.J. Kind, B.Sc. Loyola, B.Eng. (McGill), Ph.D. (Cambridge), P.Eng.

R. G. Langlois, B.Sc., M.Sc., Ph.D. (Queen's), P.Eng.

R. Liu, B.Eng., M.Eng. (Northeastern), M.Eng. (Wollongong), Ph.D. (Deakin), P.Eng.

J.M. McDill, B.Eng., M.Eng., Ph.D. (Carleton), P.Eng.

R. E. Miller, B. Sc. (Manitoba), Sc.M, Ph.D. (Brown)

Fred Nitzsche, M.S., Ph.D. (Stanford), P.Eng.

E.G. Plett, B.A.Sc. (British Columbia), S.M., Sc.D. (M.I.T.), P.Eng.

D.L. Russell, B.Eng. (Technical University of Nova Scotia), M.S., Ph.D. (M.I.T.), P.Eng. (Nova Scotia)

J.Z. Sasiadek, B.Sc., M.Sc., Ph.D., D.Sc. (Wrocław), P.Eng.

S.A. Sjolander, B.Eng., M.Eng. (Carleton), Ph.D. (Cambridge), P.Eng.

D.A. Staley, B.Sc. (British Columbia), M.A. (Toronto), Ph.D. (Western Ontario)

P.V. Straznicky, Dipl.Ing. (Brno), M.Eng. (Toronto), P.Eng.

C.L. Tan, B.Sc., Ph.D. (London)

M.I. Yaras, B.Sc. (Technical University of Istanbul), M.Eng., Ph.D. (Carleton), P.Eng.

X. Wang, B.A.Sc. (Dalian), M.A.Sc., Ph.D. (Waterloo), P.Eng.

Distinguished Research Professor
J.Y. Wong, B.Sc. (Tsing Hua), Ph.D., D.Sc. (Newcastle-upon-Tyne), F.I.Mech.E., F.A.S.M.E., C.Eng., P.Eng.

Adjunct Research Professors
E.S. Hanff, B.A.Sc. (Toronto), M.E.Sc., Ph.D., (Western Ontario), P.Eng.

J. Lo, B.A. (SUNY), M.S., Ph.D. (Cornell)

N.B. McLaughlin, B.Sc. (Guelph) M.Sc. (Saskatchewan) Ph.D. (Cornell) Ph.D. (Carleton) P.Eng.

Hany Moustapha, B.Sc. (Cairo), M.Eng., Ph.D. (McMaster)

Tofy Mussivand, M.Sc. (Tehran), M.Sc. (Florida), Ph.D. (Northeastern Ohio University College of Medicine, Akron), D.Eng. (Akron)

A.K. Pilkey, B.A.Sc., M.A.Sc., (Waterloo), Ph.D. (Carleton)

C.J. Poon, B.A.Sc., M.A.Sc., Ph.D. (Missouri-Columbia), P.Eng.

John Sinkiewicz, B.S. (Northeastern), M.S. (M.I.T.)

G. Tyc, B.Sc. (Manitoba), M.A.Sc. (Toronto), Ph.D. (Manitoba)

F.R. Vigneron, B.Sc., M.Sc. (Saskatchewan), Ph.D. (Illinois), P.Eng.

G.S. Vukovich, B.A.Sc., M.A.Sc., Ph.D. (Toronto)

William Wallace, B.Sc. (University of Manchester Institute of Science and Technology), Ph.D. (Victoria) (University of Manchester), F.I.M., F.A.S.M., C.Eng.

M.J. Worswick, B.A.Sc., M.A.Sc., Ph.D. (Waterloo), P.Eng.

J.S. Zhang, B.S., M.S. (Beijing), Ph.D. (Illinois)

Philosophy

J.A. Brook, B.A., M.A. (Alberta), D.Phil. (Oxford)

Wendy Donner, B.A. (Manitoba), M.A., Ph.D. (Toronto)

Jay Drydyk, B.A.. (Chicago), M.A. (Notre Dame), Ph.D. (Toronto)

B.I. Egyed, B.A. (Sir George Williams), M.A., Ph.D. (McGill)

P.C. Emberley, B.A. (British Columbia), M.A. (Toronto), Ph.D. (London)

Geraldine Finn, B.A. (Keele), M.A. (McMaster), Ph.D. (Ottawa)

Marvin Glass, B.A., M.A. (Manitoba)

Rebecca Kukla, B.A. (Toronto), Ph.D. (Pittsburgh)

Richard Manning, B.A., J.D., Ph.D. (Northwestern)

R.R.A. Marlin, A.B. (Princeton), M.A. (McGill), Ph.D. (Toronto)

W.R. Newell, B.A., M.A. (Toronto), Ph.D. (Yale)

Robert Stainton, B.A. (York), Ph.D. (M.I.T.)

Adjunct Professors
R.S. Talmage, M.A. (Oxford)

Julian Wolfe, B.A. (Carleton)

Adjunct Research Professors
Louis Charland, B.A., M.A. (Carleton), Ph.D. (Western Ontario)

Christine Koggel, B.A., M.A. (Carleton), Ph.D. (Queen's)

Will Kymlicka, B.A. (Queen's), B.Phil., Ph.D. (Oxford)

H.G. Lorenz, Ph.D. (Hamburg)

Joseph McDonald, B.A. (Trent), M.A., Ph.D. (Ottawa)

J. M. Thompson, M.A. (Toronto)

Physics

J.C. Armitage, B.Sc. (London), Ph.D. (Manchester)

R.K. Carnegie, B.Sc. (Queen's), M.A. (Toronto), Ph.D. (Princeton)

Stephen Godfrey, B.A.Sc. (Toronto), M.Sc. (Weizmann Institute), Ph.D. (Toronto)

B.J. Jarosz, M.Sc., Ph.D. (Warsaw)

P.C. Johns, B.A.Sc., M.Sc., Ph.D. (Toronto)

Pat Kalyniak, B.Sc. (Calgary), M.Sc., Ph.D. (British Columbia)

D.A. Karlen, B.Sc., (Alberta), Ph.D. (Stanford)

Giles Santyr, B.Sc. (Queen's), Ph.D. (British Columbia)

P.J.S. Watson, B.Sc. (Edinburgh), Ph.D. (Durham)

Distinguished Research Professor
M.K. Sundaresan, B.Sc., M.Sc. (Delhi), Ph.D. (Cornell) , Professor Emeritus

Adjunct Research Professors
Ian Cameron, B.Sc. (P.E.I.), M.Sc., Ph.D. (Waterloo)

Joanna Cygler, M.Sc., Ph.D. (University of Lodz)

M.S. Dixit, B.Sc. (Vikram), M.Sc. (Delhi), Ph.D. (Chicago)

L.H. Gerig, B.Sc. (Western), Ph.D. (New South Wales)

C.L. Greenstock, B.Sc. (Leeds), M.Sc. (London), Ph.D. (Toronto)

C.K. Hargrove, B.A. (New Brunswick), B.Sc., M.A., Ph.D. (McGill)

M.J. Losty, B.Sc. (Imperial), M.Sc. (Pennsylvania), Ph.D. (Imperial)

Barry McKee, B.Sc. (McGill), M.Sc., Ph.D. (Dalhousie)

H.J.A.F. Mes, B.Sc., Ph.D. (Ottawa)

Cheng Ng, B.Sc. (Penang), M.Sc., Ph.D. (Western Ontario)

Tony Noble, B.Sc. (New Brunswick), M.Sc., Ph.D. (British Columbia)

F.G. Oakham, B.Sc. (Bristol), M.Sc., Ph.D. (Carleton)

G.P. Raaphorst, B.Sc., M.Sc., Ph.D. (Waterloo)

D.W.O. Rogers, B.Sc., M.Sc., Ph.D. (Toronto)

C.K. Ross, B.Sc. (Mount Allison), M.Sc., Ph.D. (McMaster)

W.D. Sinclair, B.Sc., Ph.D. (Queen's)

A.J. Waker, B.Sc. (London, UK), Ph.D. (Ispra, Italy)

Honorary Research Professors
P.G. Estabrooks, B.Sc. (New Brunswick), M.Sc., Ph.D. (Wisconsin)

R.J. Hemingway, B.Sc. (Manchester), D.Phil. (Oxford)

Political Economy

H. Armstrong, B.A., M.A. (Carleton) Ph.D. (Montréal)

F.D. Abele, B.A. (Calgary), M.A., Ph.D. (Washington)

M.A. Bienefeld, B.A. (Toronto), Ph.D. (London)

Wallace Clement, B.A. (McMaster), M.A., Ph.D. (Carleton), F.R.S.C.

Bruce Curtis, B.A. (Queen's), M.A., Ph.D. (Toronto)

Simon Dalby, B.A. (Dublin), M.A. (Victoria), Ph.D. (Simon Fraser)

Vincent Della Sala, B.A. (McGill), M.A. (New York), D.Phil. (Oxford)

G.B. Doern, B.Com. (Manitoba), M.A. (Carleton), Ph.D. (Queen's)

Michael Dolan, A.B. (Harvard), M.A., Ph.D. (American)

Linda Freeman, B.A. (British Columbia), M.A., Ph.D. (Toronto)

A.J. Hunt, B.A., LL.B., Ph.D. (Leeds)

J.T. Keil, B.A. (Antioch), M.A., Ph.D. (Harvard)

Ian Lee, B.A., M.A., Ph.D. (Carleton)

A.F.D. Mackenzie, B.A. (London), M.A. (Carleton), Ph.D. (Ottawa)

Rianne Mahon, B.A. (York), M.A., Ph.D. (Toronto)

Laura Macdonald, B.A. (Queen's), M.A., Ph.D. (York)

Vincent Mosco, B.A. (Georgetown), Ph.D. (Harvard)

Allan Moscovitch, B.A. (Carleton), M.A. (Essex)

D.A. Muise, B.A. (St. Francis Xavier), M.A. (Carleton), Ph.D. (Western Ontario)

Philip Ryan, B.A., M.A. (Toronto), Ph.D. (Carleton)

Janet Siltanen, B.A., M.A. (Waterloo), D.Phil. (Cambridge)

M.C. Smith, B.A. (McGill), M.A., M.Phil., Ph.D. (Yale)

Daiva Stasiulis, B.A., M.A. (California, San Diego), Ph.D. (Toronto)

D.G. Swartz, B.A. (Queen's), B.Sc., Ph.D. (Cornell)

A.I. Wallace, B.A., D.Phil. (Oxford)

Rosemary Warskett, B.A. (Queen's), M.A., Ph.D. (Carleton)

Political Science

Jon Alexander, B.A. (Hamburg), M.A. (Southern Illinois), Ph.D. (Kansas)

S.E. Bennett, B.A. (Chicago), M.A., Ph.D. (York)

Chris Brown, B.A. (Toronto), M.A., Ph.D. (Cornell)

Andrea Chandler, B.A. (Dalhousie), M.A. (Carleton), M.Phil., Ph.D. (Columbia)

Tom Darby, A.B. (Mercer), M.A. (Georgia State), Ph.D. (York)

J. DeBardeleben, B.A., M.A., Ph.D. (Wisconsin)

Vincent Della Sala, B.A. (McGill), M.A. (New York), D.Phil. (Oxford)

Michael Dolan, A.B. (Harvard), M.A., Ph.D. (American)

Piotr Dutkiewicz, LL.M. (Warsaw), Ph.D. (Soviet Academy of Science, Moscow)

Peter Emberley, B.A. (British Columbia), M.A. (Toronto), Ph.D. (London)

Linda Freeman, B.A. (British Columbia), M.A., Ph.D. (Toronto)

B.L. Jenkins, B.A. (McGill), M.A. (Carleton), M.Phil., Ph.D. (Yale)

C.R. Jhappan, B.A. (Oxford), M.A., Ph.D. (British Columbia)

Rebecca Kukla, B.A. (Toronto), Ph.D. (Pittsburgh)

Laura Macdonald, B.A. (Queen's), M.A., Ph.D. (York)

K.D. McRae, B.A. (Toronto), A.M., Ph.D. (Harvard), F.R.S.C., Professor Emeritus

M.A. Molot, B.A., M.A. (McGill), Ph.D. (California, Berkeley)

L.K. Mytelka, B.A. (Rutgers), M.A., Ph.D. (Johns Hopkins)

W.R. Newell, B.A., M.A. (Toronto), M.Phil., Ph.D. (Yale)

Daniel Osabu-Kle, B.Eng. (Karachi), P.T.S.C., I.A.T., (Pune, India), M.A., Ph.D. (Carleton)

E. Osei-Kwadwo Prempeh, B.A. (Ghana), M.A. (Alberta), Ph.D. (Carleton)

J.T. Paltiel, B.A. (Toronto), M.A., Ph.D. (California, Berkeley)

J.H. Pammett, B.A., M.A. (Queen's), Ph.D. (Michigan)

Farhang Rajaee, B.A. (Tehran), M.P.A. (Oklahoma), Ph.D. (Virginia)

Teresa Rakowska-Harmstone, B.A. (McGill), A.M. (Radcliffe), Ph.D. (Harvard), Professor Emeritus

Fiona Robinson, B.A. (Queen's), M.A. (Carleton), Ph.D. (Montréal)

François Rocher, B.Sc., M.Sc., Ph.D. (Montréal)

M.C. Smith, B.A. (McGill), M.A., M.Phil., Ph.D. (Yale)

Mira Sucharov, B.A. (McGill), M.A. (Toronto), Ph.D. (Georgetown)

E.L. Tepper, B.A. (Michigan), M.A. (American), Ph.D. (Duke)

R.J. Van Loon, B.Sc., M.A. (Carleton), Ph.D. (Queen's)

J.M. Vickers, B.A. (Carleton), Ph.D. (London)

Harald von Riekhoff, B.A. (Western Ontario), M.A., Ph.D. (Yale)

William Walters, B.Sc. (London), M.A. (CUNY), Ph.D. (York)

Glen Williams, B.A., M.A., Ph.D. (York)

C.J. Winn, B.A. (McGill), Ph.D. (Pennsylvania)

Adjunct Professors
W.A. Mullins, B.S. (Portland), M.A. (Arizona), Ph.D. (Washington)

J.H. Sigler, A.B. (Dartmouth), M.A. (Georgetown), Ph.D. (Southern California)

M.S. Whittington, B.A., M.A. (Carleton)

Adjunct Research Professors
P.V. Lyon, B.A. (Manitoba), M.A. D.Phil. (Oxford)

Distinguished Research Professors
L.K. Mytelka, B.A. (Rutgers), M.A., Ph.D. (Johns Hopkins)

V. Subramaniam, B.Sc., M.A. (Madras), Ph.D. (Australian National)

Psychology

D.A. Andrews, B.A., M.A. (Carleton), Ph.D. (Queen's), C.Psych.

H. Anisman, B.A. (Sir George Williams), M.A. (Memorial), Ph.D. (Waterloo)

A. Bowker, B.A.(Concordia), M.A., Ph.D. (Waterloo)

F. Cherry, B.A., M.A. (York), Ph.D. (Purdue)

R. J. Coplan, B.Sc. (McGill), M.A., Ph.D. (Waterloo)

T. Daniels, B.A. (Queen's), M.A., Ph.D. (Waterloo)

C. Davis, B.A. (Trent), M.A., Ph.D. (British Columbia)

R.F. Dillon, B.A. (Dartmouth), M.S. (Florida), Ph.D. (Virginia)

A.E. Forth, B.A., M.A., Ph.D. (British Columbia)

P.A. Fried, B.Sc. (McGill), M.A., Ph.D. (Waterloo)

M.L. Gick, B.Sc. (McGill), Ph.D. (Michigan)

C.M. Herdman, B.Sc. (Trent), M.Sc., Ph.D. (Alberta)

R.D. Hoge, B.A. (Kenyon), M.A., Ph.D. (Delaware)

J.B. Kelly, B.A. (Southwestern, Memphis), Ph.D. (Vanderbilt)

C.M. Kristiansen, B.Sc. (Toronto), M.Sc. (London), Ph.D. (Exeter)

J.A. LeFevre, B.Sc., M.Sc., Ph.D. (Alberta)

C. Leth-Steensen, B.A., M.A. (Carleton), Ph.D. (McGill)

G. Lindgaard, B.Sc., M.A., Ph.D. (Monash)

J.S. Logan, B.Sc. (Dalhousie), Ph.D. (Indiana)

J. Mantler, B.A. (Trinity Western), M.A., Ph.D. (Windsor)

K.J. Matheson, B.A. (Carleton), Ph.D. (Waterloo)

D.C. McIntyre, B.A. (Carroll College), M.A. (Northern Illinois), Ph.D. (Waterloo)

B.A. Pappas, B.A., M.A., Ph.D. (Queen's)

L. Paquet, B.A., M.A. (Moncton), Ph.D. (Waterloo)

S.E. Parlow, B.Sc. (Victoria), M.A., Ph.D. (Toronto)

W.M. Petrusic, B.A. (British Columbia), M.A., Ph.D. (Michigan)

M.O. Poulter, B.A. (British Columbia), Ph.D. (McGill)

J.D. Pozzulo, B.A. (York), M.A., Ph.D. (Queen's)

T.A. Pychyl, B.Sc. (McMaster), B.Ed. (Ottawa), M.A., Ph.D. (Carleton)

M. Senechal, B.Ps., M.A. (Moncton), Ph.D. (Alberta)

B.W. Tansley, B.A., M.A. (British Columbia), M.A., Ph.D. (Rochester), C. Psych.

W.B. Thorngate, B.A. (California, Santa Barbara), M.A., Ph.D. (British Columbia)

R. West, B.A. (British Columbia), M.A. (Simon Fraser), Ph.D. (British Columbia)

J.W. Wood, B.A. (DePauw), M.A., Ph.D. (Missouri)

S.H. Wu, M.D. (Shanghai Second Medical University)

R.M. Zacharko, B.Sc. (Montreal), M.A., Ph.D. (Saskatchewan)

Distinguished Research Professor
B.R. Little, B.A. (Victoria), Ph.D. (California, Berkeley)

T.N. Tombaugh, B.A. (DePauw), M.A., Ph.D. (Missouri), C.Psych.

Professors Emeritus
L.H. Strickland, A.B. (Johns Hopkins), Ph.D. (North Carolina)

T.N. Tombaugh, B.A. (DePauw), M.A., Ph.D. (Missouri), C.Psych.

Adjunct Research Professors
S. Borys, B.A. (Manitoba), M.A., Ph.D. (Waterloo)

G. Bourgon, Ph.D. (Ottawa)

E.J. Casson, B.A. (Queen's), M.A. (Alberta), Ph.D. (Stanford)

J. C. de la Torre, B.S. (American), M.D. (Madrid), Ph.D. (Geneva)

S. Dubreuil, B.A., M.A., Ph.D. (Carleton)

P. Farrell, B.A.Sc., M.A.Sc., Ph.D. (Toronto)

G. Goldfield, B.A., M.A., Ph.D. (Carleton)

J.L. Harbluk, B.Sc. (Toronto), M.A., Ph.D. (Western)

B. Hutcheon, B.Sc., Ph.D. (British Columbia)

P. Kleinplatz, B.A., Ph.D. (Ottawa)

V. Knott, B.A. (Carleton), M.A. (Guelph), D.Phil. (London)

D. Koszycki, B.A. (Concordia), M.A., Ph.D. (Carleton)

S.M. Kuehn, B.A. (Carleton), M.A., Ph.D. (Waterloo)

I.G. Manion, B.A. (Ottawa), M.A., Ph.D. (Western Ontario)

A. **Meier**, B.A., B.Ed., M.A., Ph.D. (Ottawa)

J. Mills, B.A. (Queen's), B.Comm (Carleton), M.A. (Queen's), Ph.D. (Carleton)

L.L. Motiuk, B.A., M.A. (Ottawa), Ph.D. (Carleton)

J. Olds, Ph.D. (McMaster)

L.A. Patrick, M.A. (Carleton), Ph.D. (Ottawa)

C.M.S. Plowright, B.Sc., M.A., Ph.D. (Toronto)

P.N. Prince, B.A., M.A., Ph.D. (Carleton)

A.V. Ravindran, B.A. (Ceylon), M.Sc. (Brunel), Ph.D. (Liverpool)

M.L. Rees, B.A. (Victoria), M.A., Ph.D. (Carleton)

D. Robinson, B.A. (St. Francis Xavier), M.A., Ph.D. (Carleton)

R.C. Serin, B.A., M.A., Ph.D. (Queen's)

I. Shields, B.A. (Carleton), M.A. (Ottawa), Ph.D. (Queen's)

D. Simourd, B.A. (Carleton), M.A. (Lakehead), Ph.D. (Carleton)

L.B. Stelmach, B.Sc. (Toronto), M.Sc., Ph.D. (Alberta)

G.A. Tasca, B.A. (Concordia), M.A. (Regina), Ph.D. (Saskatchewan)

A. Tellier, B.A. (McGill), M.A., Ph.D. (Windsor)

E.M. Thomas, M.A., Ph.D. (Carleton)

J.A. Veitch, B.Sc. (Manitoba), M.A. (Queen's), Ph.D. (Victoria)

J.R. Weekes, B.A., M.A. (Carleton), Ph.D. (Ohio)

School of Public Policy and Administration

F.D. Abele, B.A. (Calgary), M.A., Ph.D. (York)

M.A. Bienefeld, B.A. (Toronto), Ph.D. (London)

C.M. Carmichael, B.A. (Western Ontario), M.P.A., Ph.D. (Princeton)

G.B. Doern, B.Com. (Manitoba), M.A. (Carleton), Ph.D. (Queen's)

R.H. Farquhar, B.A., M.A. (British Columbia), Ph.D. (Chicago), F.C.C.E.A.

K.A.H. Graham, B.A. (York), M.A. (Queen's)

E. T. Jackson, B.A. (Western Ontario), M.Ed., Ed.D. (Toronto)

R. Mahon, B.A. (York), M.A., Ph.D. (Toronto)

A.M. Maslove, B.A. (Manitoba), Ph.D. (Minnesota)

L. Mills, B.A. (Melbourne), M.A., Ph.D. (Toronto)

L.A. Pal, B.A. (Mount Allison), M.A., Ph.D. (Queen's)

S.D. Phillips, B.A. (Victoria), M.A. (Waterloo), M.A., Ph.D. (Carleton)

P. Ryan, B.A., M.A. (Toronto), Ph.D. (Carleton)

S. Schott, B.A. (Ottawa), M.A., Ph.D. (Guelph)

S. Schwartz, B.Sc., Ph.D. (Wisconsin)

D.G. Swartz, B.A. (Queen's), B.Sc., Ph.D. (Cornell)

E. Swimmer, B.A. (City College of New York), M.A. (Chicago), Ph.D. (Cornell)

G.B. Toner, B.A. (Saskatchewan), M.A. (Alberta), Ph.D. (Carleton)

S.L. Winer, B.A. (Carleton), M.A., Ph.D. (Johns Hopkins)

Religion

J. Cove, B.A., M.A. (Dalhousie), Ph.D. (British Columbia)

J.P. Dourley, B.A. (Ottawa), M.A. (Toronto), Ph.D. (Fordham)

B. Given, B.A., M.A. (Carleton), Ph.D. (Alberta)

C. Laughlin, B.A. (San Francisco), M.A., Ph.D. (Oregon)

L.T. Librande, B.A. (St. Louis), M.A. (Syracuse), Ph.D. (McGill)

I. Prattis, B.A. (London), B.Litt. (Oxford), Ph.D. (British Columbia)

J.G. Ramisch, B.A. (St. Marys), M.A., Ph.D. (Catholic University of America)

Eugene Rothman, B.A. (Hebrew), M.A. (Columbia), Ph.D. (London)

S.G. Wilson, B.A., Ph.D. (Durham)

Adjunct Research Professors
Nalini Davdas, B.D. (Yale), M.A. (Madras), Ph.D. (Bombay)

Harsha Dehejia, M.A. (Carleton), Ph.D. (Bombay)

A. Gualtieri, B.A., B.D., S.T.M., Ph.D. (McGill)

Social Work

Hugh Armstrong, B.A., M.A. (Carleton), Ph.D. (Montréal)

Gerald de Montigny, B.A. (British Columbia), M.A., M.S.W. (Toronto), Ph.D. (Toronto)

Roy Hanes, B.A. (Dalhousie), M.S.W. (Carleton), Ph.D. (McGill)

Steven Hick, B.A., B.S.W. (McMaster), M.P.A. (Carleton), Ph.D. (Toronto)

Therese Jennissen, B.A. (Alberta), M.S.W. (Carleton), Ph.D. (McGill)

Colleen Lundy, B.Sc. (Ottawa), M.S.W. (Carleton), Ph.D. (Florida State)

Bernice Moreau, B.A., M.A. (Dalhousie), M.A. (Institute for Christian Studies), Ph.D. (Toronto)

Allan Moscovitch, B.A. (Carleton), M.A. (Essex)

Diana Ralph, B.A. (Wayne State), M.S.W. (Columbia), M.A., Ph.D. (Regina)

Gillian Walker, B.A., M.S.W. (British Columbia), Ph.D. (Toronto)

Elizabeth Whitmore, B.A., M.S.W. (Boston), Ph.D. (Cornell)

Adjunct Professors
S.J. Albert, B.Sc. (Carleton), M.S.W. (Toronto), D.S.W. (Columbia)

Sociology and Anthropology

Nahla Abdo, B.A., M.A. (Haifa), Ph.D. (Toronto)

H. Armstrong, B.A., M.A. (Carleton), Ph.D. (Montréal)

Valda Blundell, B.A. (George Washington), M.A., Ph.D. (Wisconsin)

T.C. Caputo, B.A., M.A. (Windsor), Ph.D. (Michigan State)

Jacques Chevalier, B.Ph. (Ottawa), B.A. (Carleton), Ph.D. (Edinburgh)

Wallace Clement, B.A. (McMaster), M.A., Ph.D. (Carleton), F.R.S.C.

John Cove, B.A., M.A. (Dalhousie), Ph.D. (British Columbia)

C. Cray, B.A. (New College), M.S., Ph.D. (Wisconsin)

Bruce Curtis, B.A. (Queen's), M.A., Ph.D. (Toronto)

W.S. DeKeseredy, B.A., M.A., Ph.D. (York)

John de Vries, B.A. (Sir George Williams), M.Sc., Ph.D. (Wisconsin)

A. Doucet, B.A. (York), M.A. (Carleton), Ph.D. (Cambridge)

J. Dourley, B.A., L.Ph., S.T.L., M.Th. (Ottawa), M.A. (Toronto), Ph.D. (Fordham)

D.P. Forcese, B.A., M.A. (Manitoba), Ph.D. (Washington St. Louis)

B.J. Given, B.A., M.A. (Carleton), Ph.D. (Alberta)

Charles Gordon, B.A. (Amherst), Ph.D. (North Carolina)

A.J. Hunt, B.A., LL.B., Ph.D. (Leeds)

J.T. Keil, B.A. (Antioch), M.A., Ph.D. (Harvard)

Florence Kellner, B.A. (Douglass College), M.A., Ph.D. (Rutgers)

Katharine Kelly, B.A., M.A., Ph.D. (Toronto)

C.D. Laughlin, B.A. (San Francisco), M.A., Ph.D. (Oregon)

Zhiqiu Lin, B.A. (Heilongjiang), M.A., Ph.D. (Calgary)

R. Mahon, B.A. (York), M.A., Ph.D. (Toronto)

K. March, B.A., M.A., Ph.D. (McMaster)

H.J. Maroney, B.A. (Carleton), M.A., Ph.D. (McMaster)

M. Martin, B.A. (Laval, UQAM), M.A. (Montréal), Ph.D. (Toronto)

B.A. McFarlane, B.A., M.A. (McGill), Ph.D. (London), Professor Emeritus

Craig McKie, B.A., M.A. (York), Ph.D. (Toronto)

B. McFarlane, Professor Emeritus

M.W. McMahon, B.Soc.Sc. (Dublin), M.A., Ph.D. (Toronto)

P. Medway, B.A., M.A. (Oxford), Ph.D. (Leeds)

V. Mosco, B.A. (Georgetown), Ph.D. (Harvard)

Terrance Nosanchuk, B.A. (Wayne State), M.A., Ph.D. (Chicago)

Ian Prattis, B.A. (London), B.Litt. (Oxford), Ph.D. (British Columbia)

J. Shepherd, B.A., B.Mus. (Carleton), A.R.C.M. (Royal College of Music), D.Phil. (York, U.K.)

Rob Shields, B.A., M.A. (Carleton), D.Phil. (Sussex)

Janet Siltanen, B.A., M.A. (Waterloo), D.Phil. (Cambridge)

D.G. Smith, B.A. (British Columbia), M.A., Ph.D. (Harvard)

Daiva Stasiulis, B.A., M.A. (California, San Diego), Ph.D. (Toronto)

G. Walker, B.A., M.S.W. (British Columbia), Ph.D. (Toronto)

R. Warskett, B.A. (Queen's), M.A. (Carleton)

Distinguished Research Professor
G. Neuwirth, Dr. Res. Pol. Graz., Ph.D. (Minnesota)

Adjunct Professors
Joseph Manyoni, B.A. (South Africa), Dip. Soc. Anthro., M.Litt., D.Phil. (Oxford)

Adjunct Research Professors
S. Brascoupe, B.A., M.A. (SUNY at Buffalo)

A. Bujra, B.A., Ph.D. (London)

J.P. Chartrand, B.A., M.A. (Carleton)

Scott Clark, B.A. (Carleton), Ph.D. (Edinburgh)

B.C. Gordon, B.Sc. (British Columbia), B.A. (Washington), Ph.D. (Calgary)

T. Haddad, B.A., M.A., Ph.D. (York)

John Harp, B.A. (Saskatchewan), M.Sc., Ph.D. (Iowa State)

A. Laforet, B.A., Ph.D. (British Columbia)

D.J. Loree, B.A., M.A. (McMaster), Ph.D. (Alberta)

Michael Petrunik, B.A. (Windsor), Ph.D. (Toronto)

M. Mitchell, B.A. (Toronto), M.A. (McGill), Ph.D. (Carleton)

D.A. Norris, B.Sc., M.Sc. (McGill), Ph.D. (Johns Hopkins)

F.C. Pinch, B.A. (Acadia), M.A. (McMaster), Ph.D. (Maryland)

Bali Ram, B.A., M.A. (Varanasi), M.A. (Western), Ph.D. (Ohio State)

Paul Reed, B.A. (York), M.A., Ph.D. (Toronto)

G.D. Reimer, B.A. (Winnipeg), M.A., Ph.D. (McMaster)

Stephen Richer, B.A., M.A. (McGill), Ph.D. (Johns Hopkins)

T.J. Samuel, Ph.D. (Toronto)

V. Shalla, B.A. (Laurentian), M.Sc. (Montréal), Ph.D. (Carleton)

A.D. Steeves, M.S.A. (Toronto), Ph.D. (Michigan)

G.M. Torrance, B.A., M.A., Ph.D. (Toronto)

Linda Williams, B.Sc. (Loyola), M.A. (Washington), Ph.D. (Toronto)

Systems and Computer Engineering

V. Aitken, B.A.Sc. (British Columbia), M.Eng., Ph.D. (Carleton)

A.J. Bailetti, B.Sc. (Univ. National de Ingenieria, Peru), M.B.A., Ph.D. (Cincinnati)

A.H. Banihashemi, B.Sc. (Isafahan University of Technology), M.Sc. (Tehran University), Ph.D. (Waterloo)

J.R. Callahan, B.Sc. (Carleton), M.A., Ph.D. (Toronto)

J.W. Chinneck, B.A.Sc., M.A.Sc., Ph.D. (Waterloo)

D.C. Coll, M.Eng. (McGill), Ph.D. (Carleton) Professor Emeritus

Mihail Devetsikiotos, Dipl. Elect. Eng. (Thessaloniki), M.Sc., Ph.D. (North Carolina)

M.S. El-Tanany, B.Sc., M.Sc. (Cairo), Ph.D. (Carleton)

D.D. Falconer, B.A.Sc. (Toronto), S.M., Ph.D. (M.I.T.)

M. Frize, B.A.Sc. (Ottawa), M.Phil., D.I.C. (Imperial), M.B.A. (Moncton), Ph.D. (Erasmus)

Donald Gerwin, B.S. (Carnegie-Mellon), M.S. (Case Western Reserve), Ph.D. (Carnegie-Mellon)

R.A. Goubran, B.Sc. (Cairo), M.Sc., Ph.D. (Carleton)

H.M. Hafez, B.Sc., M.Sc. (Alexandria), Ph.D. (Carleton)

T. Kunz, Diplom., Ph.D. (Darmstadt)

Ioannis Lambadaris, B.Eng. (Thessaloniki), M.Sc. (Brown), Ph.D. (Maryland)

S.A. Mahmoud, B.Sc. (Ain Shams), M.Eng., Ph.D. (Carleton)

Shikharesh Majumdar, B.Eng. (Jadavpur), M.Eng. (Politecnico di Torino, Italy), M.Sc., Ph.D. (Saskatchewan)

Bernard Pagurek, M.A.Sc., Ph.D. (Toronto)

T.W. Pearce, B.Eng., M.Eng. (Carleton), Ph.D. (Queen's)

D.C. Petriu, Dipl.Eng. (Timisoara), Ph.D. (Carleton)

J.A. Rolia, B.C.S. (Carleton), M.Sc., Ph.D. (Toronto)

D. Rossille, Eng. Dipl. (Université de Rennes), M.Sc. (University of Wales), Ph.D. (Universite de Nice-Sophia, Antipolis)

H.M. Schwartz, B.Eng. (McGill), M.Sc., Ph.D. (M.I.T.)

C.M. Woodside, B.A.Sc. (Toronto), Ph.D. (Cambridge)

H. Yanikomeroglu, B.Sc. (Middle East Technical University), M.A.Sc., Ph.D. (Toronto)

Adjunct Research Professors
S. Abu-Hakima, B.Eng. (McGill), M.Eng., Ph.D. (Carleton)

A. Bieszczad, M.I. (Jagiellonian), M.C.S., Ph.D. (Carleton)

R.J.C. Bultitude, B.Sc. (New Brunswick), M.Eng., Ph.D. (Carleton)

R.J.A. Buhr, B.Sc. (Queen's), M.Sc. (Saskatchewan), Ph.D. (Cambridge)

L.R. Morris, B.A.Sc. (Toronto), D.I.C. (Imperial), Ph.D. (London)

G.M. Karam, B.A.Sc. (Ottawa), M.Eng., Ph.D. (Carleton)

R.D. Peacocke, B.A. (Cambridge), M.Sc. (Alberta), Ph.D. (Toronto)

S. Periyalwar, B.Eng. (Bangalore), M.A.Sc., Ph.D. (Technical University of Nova Scotia)

Leo Strawczynski, B.Sc., M.Sc. (McGill), Ph.D. (Rochester)

C.R. Walker, F.R.C.P. (C) (Royal College of Physicians and Surgeons of Canada), M.B., Ch.B. (University of Manchester)

Y. Wu, B.Eng. (Beijing University of Telecommunications), M.Eng., Ph.D. (Carleton)

G.M. Yee, B.Sc., M.Sc., Ph.D. (Carleton)

Women's Studies

Virginia Caputo, B.Mus. (Windsor), M.A., Ph.D. (York)

Fran Klodawsky, B.A. (Toronto), M.A. (Ohio State), Ph.D. (Queen's)

Susan Whitney, B.A. (Princeton), M.A. (Brown), Ph.D. (Rutgers)

Gurli Woods, Forprove (Aarhus), Ph.D. (British Columbia)

Adjunct Research Professors
Heather Menzies, B.A. (McGill)

Adjunct Professors
Sandra Campbell, B.A., M.A. (Carleton), Ph.D. (Ottawa)

Helen Levine, B.A. (Queen's), Diploma, Social Work (Toronto)

Professors Emeriti
J.G. Bellamy, B.A. (Oxford), M.A. (Oxford and Nottingham), Ph.D. (Nottingham)

A.R. Boothroyd, B.Sc.Eng., Ph.D. (London), F.I.E.E.E.

D.C. Coll, M.Eng. (McGill), Ph.D. (Carleton)

M. Copeland, B.Sc. (Manitoba), M.A. Sc., Ph.D. (Toronto), F.I.E.E.E., P.Eng.

Miklós Csörgó, B.A. (Budapest), M.A., Ph.D. (McGill), F.R.S.C.

V. Dlab, RNDr., C.Sc. (Charles, Prague), Ph.D. (Khartoum), D.Sc. (Charles), F.R.S.C.

D.M.L. Farr, B.A. (British Columbia), M.A. (Toronto), D. Phil. (Oxford)

J. Goldak, B.Sc., M.Sc., Ph.D. (Alberta), P.Eng.

N.E.S. Griffiths, B.A. (London), M.A. (New Brunswick), Ph.D. (London), Doct. d'Hist. (Université de Moncton), Doct. d'Hist., (Ste-Anne, N.S.), Doc. Hum. Lett. (Mount St. Vincent), F.R.S.C.

H.F. Howden, B.A., M.S. (Maryland), Ph.D. (North Carolina)

V.N. Iyer, M.Sc., Ph.D. (Bombay)

M.E. McCully, B.Sc., M.Sc. (Toronto), Ph.D. (Harvard)

B.A. McFarlane, B.A., M.A. (McGill), Ph.D. (London)

K.D. McRae, B.A. (Toronto), A.M., Ph.D. (Harvard), F.R.S.C.

S.R. Mealing, B.A. (Alberta), B.Litt., M.A. (Oxford)

H.B. Neatby, B.A. (Saskatchewan), M.A. (Oxford), Ph.D. (Toronto), F.R.S.C.

Teresa Rakowska-Harmstone, B.A. (McGill), A.M. (Radcliffe), Ph.D. (Harvard)

H.I.H. Saravanamuttoo, B.Sc. (Glasgow), Ph.D. (Bristol), F.C.A.S.I., F.I.Mech.E., F.A.S.M.E., P.Eng.

L. Strickland, A.B. (Johns Hopkins), Ph.D. (North Carolina)

M.K. Sundaresan, B.Sc., M.Sc. (Delhi), Ph.D. (Cornell)

M.J. Sydenham, B.A., Ph.D. (London), F.R.Hist.S.

E.G. West, M.Sc., Ph.D. (London)

S.F. Wise, C.M., B.A., B.L.S. (Toronto), M.A. (Queen's), LL.D. (Guelph), F.R.S.C.

Officers of the University

Chancellor

Arthur Kroeger, C.C., M.A., LL.D.

President and Vice-Chancellor

Richard J. Van Loon, B.Sc., M.A., Ph.D.

Board of Governors (2001-2002)

Chair
Allan Lumsden, C.A., B.Com.

Vice-Chair
Jocelyn Ghent Mallett, B.A., M.A., Ph.D.

Ex Officio Members
The Chancellor
The President and Vice-Chancellor

Elected Members

Retire June 30, 2002
Louise Bergeron-de Villiers, B.A.
Margaret Bloodworth, B.A., LL.B.
Ross Donaldson, B.A., M.A.
David Dunn, B.Arch.
Tom Grant
Robert Johnson, M.A.
Nazeer Ladhani, M.B.A.
Robert Laughton, Q.C., B.A., LL.B.
Allan Lumsden, C.A., B.Com.
Barbara McNally, B.A.
Shirley Mills, B.Sc., M.Sc., Ph.D.
Gail Harmer Mutton, B.A.
Jay Nordenstrom
James Pratt
Jacques Shore, LL.B., LL.L.
James Watson, B.A.

Retire June 30, 2003
Margaret Dacey, C.H.R.P.
Peter Doherty, B.A., C.F.A.
Linda Duxbury, B.Sc., M.A.Sc., Ph.D.
Andrew Haydon, B.Sc.
Michelle Sutherland

Retire June 30, 2004
Nancy Hughes Anthony, B.A.
Vinod Kumar, B.Sc., B.Eng., M.Eng., Ph.D., P.Eng.
Edward Lai, B.Sc., M.Phil., Ph.D.
Gail Larose, B.A., M.A.
Frank Ling, A.A.Dipl., M.C.U.
Jocelyn Ghent Mallett, B.A., M.A., Ph.D.
Judith Moses, B.A.
Katharine Saunders, B.A., M.Ed.

Secretary, Board of Governors
Lynn Collins

Senate of the University (2001-2002)

Ex Officio Members
Vice-President G.S. Adam, B.J., M.A., Ph.D.
Dean R.C. Blockley, B.A., M.A., Ph.D.
Associate Professor Martien de Leeuw, B.Sc., B.I.D., M.B.A.
Professor Frank Dehne, B.Sc., M.Sc., Ph.D.

Dean Aviva Freedman, B.A., M.A., Ph.D.
Professor Gulzar Haider, B.Sc., M.S., B.Arch., Ph.D.
Vice-President Feridun Hamdullahpur, B.Eng., M.Eng., Ph.D., P.Eng.
Chancellor Arthur Kroeger, C.C., M.A., LL.D.
Dean L. Librande, B.A., M.A., Ph.D.
Dean S. Mahmoud, B.Sc., M.Eng., Ph.D., P.Eng.
Dean A.M. Maslove, B.A., Ph.D.
Mr. Jay Nordenstrom
Ms Andrea Rounce
President R.J. Van Loon, B.Sc., M.A., Ph.D.
Dean P.J.S. Watson. B.Sc., Ph.D.
Vice-President D.R. Watt, B.Eng., M.B.A.

Board Appointees
Mr. Ross Donaldson, B.A., M.A.
Ms G. Mutton, B.A.
Mrs. Barbara McInnes, B.A.
Mr. Jacques Shore, LL.B., LL.L.

Elected Members
Professor Fred Afagh, B.Sc., M.Sc., Ph.D., P.Eng.
Professor J.C. Armitage, B.Sc., Ph.D.
Associate Professor J. Blenkinsop, B.Sc., M.Sc., Ph.D.
Ms Jennifer Breakspear
Mr. Joseph Bright
Professor J.A. Brook, B.A., M.A., D.Phil.
Ms Tracy Coates
Associate Professor David Cray, B.A., M.S., Ph.D.
Mr. Marco D'Angelo
Mr. Matthew Deline
Professor Linda Duxbury, B.Sc., M.A.Sc., Ph.D.
Assistant Professor Steven Fai, B.Arch., M.Arch., M.R.A.I.C.
Associate Professor Lois Frankel, B.F.A., M.A., M.E.Des., Dip. Crafts & Design
Associate Professor M. Glass, M.A.
Associate Professor Charles Gordon, B.A., Ph.D.
Professor D. Howe, B.A., M.S., Ph.D.
Associate Professor Boguslaw Jarosz, M.Sc., Ph.D.
Professor Elaine Keillor, B.A., M.A., Ph.D.
Associate Professor Jacob Kovalio, B.A., M.A., Ph.D.
Professor Vinod Kumar, B.Sc., B.Eng., M.Eng., Ph.D., P.Eng.
Associate Professor E. Lai, B.Sc., M.Phil., Ph.D.
Professor Tim Law, B.Sc., M.Sc., Ph.D.
Associate Professor D. Long, B.A., Ph.D.
Gregory MacIsaac, B.A., M.A.
Associate Professor M. Mac Neil, B.Sc., LL.B., LL.M.
Ms Karin Manning
Mr. Mike McGinn
Associate Professor G. McKnight, B.A., M.A., Ph.D.
Associate Professor S.E. Mills, B.Sc., M.Sc., Ph.D.
Professor M. Nakhla, B.Sc., M.Sc., Ph.D., P.Eng.
Professor Leslie Pal, B.A., M.A., Ph.D.
Mr. James Patterson

Associate Professor Dorina Petriu, Dipl.Eng., Ph.D.
Associate Professor S. Phillips, B.A., M.A., Ph.D.
Professor Zuzana Pick, L.ès.L., M.A., D.3e.cycle
Professor Ian Pringle, M.A.
Associate Professor J. Ramisch, B.A., M.A., Ph.D.
Professor Archibald Ritter, B.A., M.A., Ph.D.
Associate Professor Sinclair Robinson, B.A., M.A.
Associate Professor D. Russell, B.Eng., M.S., Ph.D.
Ms Jill Scott
Mr. Ian Stakenvicius
Professor Roland Thomas, B.Sc., M.Sc., Ph.D.
Professor K. Torrance, B.S.A., M.S., Ph.D.
Professor Barry Wright, B.A., LL.B., LL.M., D.Jur.

Special Appointments
Professor C.H. Chan, B.Sc., M.A.Sc., Ph.D., P.Eng. (Clerk of Senate)
Professor D. Forcese, M.A., Ph.D.
Mr. Brian Ford, B.A.
Mr. Martin Foss, B.A., B.L.S.

Officers of Administration

President and Vice-Chancellor
Richard J. Van Loon, B.Sc., M.A. (Carleton), Ph.D. (Queen's)
Vice-President (Academic), Provost and University Registrar
G. Stuart Adam, B.J., M.A. (Carleton), Ph.D. (Queen's)

Vice-President (Research)
Feridun Hamdullahpur, B.Eng., M.Eng. (Technical University of Istanbul), Ph.D. (Technical University of Nova Scotia), P.Eng.

Vice-President (Finance and Administration)
Duncan R. Watt, B.Eng.(Royal Military College), M.B.A. (Ottawa)

Vice-President (Advancement)
Lucinda E. Boucher, B.A. (Carleton)

Associate Vice-President (Enrolment Management)
Susan Gottheil, B.A. (McGill), M.A. (Sarah Lawrence)

Assistant Vice-President (Development and Alumni)
Serge Arpin, B. Soc. Sci. (Ottawa)

Dean of the Faculty of Graduate Studies and Research
Roger C. Blockley, B.A. (Leicester), M.A. (McMaster), Ph.D. (Nottingham)

Dean of the Faculty of Arts and Social Sciences
Aviva K. Freedman B.A. (McGill), M.A. (Columbia), Ph.D. (Montreal)

Dean of the Faculty of Engineering and Design
Samy A. Mahmoud, B.Sc. (Ain Shams), M.Eng., Ph.D. (Carleton), P.Eng.

Dean of the Faculty of Public Affairs and Management
Allan M. Maslove, B.A. (Manitoba), Ph.D. (Minnesota)

Dean of the Faculty of Science
Peter J.S. Watson, B.Sc. (Edinburgh), Ph.D. (Durham)

Dean of Students
Leonard T. Librande, B.A. (St. Louis), M.A. (Syracuse), Ph.D. (McGill)

Associate Dean of the Faculty of Graduate Studies and Research
A. Ghani Razagpur, B.Sc. (American University, Beirut), M.Sc. (Hawaii), Ph.D. (Calgary) P.Eng.

Associate Dean of the Faculty of Arts and Social Sciences (Undergraduate Affairs)
Grover F. Goodwin, B.A. (Virginia), Ph.D. (Princeton)

Associate Dean of the Faculty of Arts and Social Sciences (Research and Development)
John Shepherd, B.A., B.Mus. (Carleton), A.R.C.M. (Royal College of Music), D. Phil. (York, U.K.)

Associate Dean of the Faculty of Arts and Social Sciences (Special Projects)
Michael Smith, B.Sc. (Liverpool), M.A. (Georgia), Ph.D. (British Columbia)

Associate Dean of the Faculty of Engineering and Design
Donald L. Russell, B.Eng. (Technical University of Nova Scotia), M.S., Ph.D. (Massachusetts Institute of Technology)

Associate Dean of the Faculty of Public Affairs and Management (Undergraduate Programs) and Director of the Kroeger College of Public Affairs
Eileen M. Saunders, B.A. (St. Francis Xavier), M.A. (Queen's), Ph.D. (Carleton)

Associate Dean of the Faculty of Public Affairs and Management (Research and Faculty Development)
Katherine A. Graham, B.A. (York), M.A. (Queen's)

Associate Dean of the Faculty of Public Affairs and Management (Undergraduate Affairs)
Jon H. Pammett, B.A., M.A. (Queen's), Ph.D. (Michigan)

Associate Dean of the Faculty of Science
Brian C. Mortimer, B.Sc. (Carleton), M.Sc. (Alberta), Ph.D. (London)

Associate Dean of the Faculty of Science (Research)
Jorg-Rudiger Sack, Vordiplom, Diplom (Bonn), Ph.D. (McGill)

Director of the School of Architecture
Gulzar Haider, B.Sc. (West Pakistan), M.S., B.Arch., Ph.D. (Illinois)

Director of the School of Business
Vinod Kumar, B.Sc. (Agra), B.Eng. (Roorke), M.Eng. (California at Berkeley), Ph.D. (Manitoba) P.Eng.

Director of the School of Canadian Studies
Francois Rocher (Acting)

Director of the School of Computer Science
Frank Dehne, B.Sc., M.Sc. (Technical University
of Aachen), Ph.D. (Wurzburg)

Director of the School of Industrial Design
Martien de Leeuw, B.Sc. (Waterloo), B.I.D.
(Carleton), M.B.A. (Ottawa)

Director of the Norman Paterson School of
International Affairs
Maureen A. Molot, B.A., M.A. (McGill), Ph.D.
(California at Berkeley)

Director of the School of Journalism and
Communication
Christopher T. Dornan, B.J. (Carleton), M.A.
(Cambridge), Ph.D. (McGill)

Director of the School of Linguistics and Applied
Language Studies
Ian W.V. Pringle, M.A. (Auckland)

Director of the School of Mathematics and
Statistics
Angelo B. Mingarelli, B.Sc.(Concordia), M.Sc.,
Ph.D. (Toronto)

Director of the School of Public Administration
Leslie Pal, B.A. (Mount Allison), M.A., Ph.D.
(Queen's)

Director of the School of Social Work
Colleen Lundy, B.Sc. (Ottawa), M.S.W.
(Carleton), Ph.D. (Florida State)

Director of the School for Studies in Art and
Culture
Bryan R. Gillingham, B.A., B.Mus. (British
Columbia), M.Mus. (King's College), Ph.D.
(Washington)

Director of the College of the Humanities (pro
tempore)
Stephen G. Wilson, B.A., Ph.D. (Durham)

Director of the College of Natural Sciences
Leslie Copley, B.Sc. (Carleton), M.Sc.
(McMaster), Ph.D. (Toronto)

University Librarian
Martin Foss, B.A. (Alberta), B.L.S. (British
Columbia)

Chief Information Officer
Wendy Stark, B.A. (Brock), M.L.S. (Western
Ontario)

Director of Carleton International
K.J. McGillivray, B.A. (Carleton), Ph.D. (London)

Director of Carleton University Art Gallery
Michael Bell, B.A., M.A. (Toronto)

Director of Equity Services
To be announced

Director of Finance
J.T. Sullivan, B.A. (McGill), C.G.A.

Director of Health and Counselling Services
David R. Pfeiffer, M.D. (Ottawa), C.C.F.P.

Director of Housing and Food Services
David L. Sterritt, B.A. (Carleton)

Director of Human Resources
Elizabeth Cameron, B.Com. (Carleton)

Director of Instructional Services
Ross Mutton, B.A.A. (Ryerson)

Director of Internal Audit and Advisory Services
Keith Gibbs, B.A., M.A. (McGill) C.A.

Director of Institutional Research and Planning
J. David Holmes, B.A., M.A. (Cambridge),
M.L.S. (Western Ontario), Ph.D. (Keele)

Director of Pension Fund Management
Elizabeth B. Springer, B.A. (Smith), M.B.A.
(Boston), C.A.

Director of the Physical Plant
Darryl K. Boyce, B.Sc.Eng. (Alberta)

Director of Physical Recreation and Athletics
G.A. (Drew) Love, B.A., M.A. (Carleton), M.B.A.
(Ottawa)

Director of the School of Continuing Education
Bernadette Landry, B.A. (Ottawa)

Director of Student Awards
Carol Fleck

Director, University Communications (Acting)
MaryAnne Pomainville

Director of University Safety and Parking
Mark Tinlin, OStJ, C.D., B.A. (Carleton), Dip.P.S.
(Western Ontario), C.E.S.

Director of University Services and Purchasing
Edward Kane, B.A. (Ulster)

University Secretary
David Van Dine, B.A.(Carleton), LL.B.(Ottawa)

Librarians

Kristof Avramsson, B.A. (Ottawa), M.L.I.S.
(Western Ontario)
Heather Britt, B.Mus. (Mount Allison), M.L.S.
(Western Ontario)
Laurie G. Campbell, B.A. (Queen's), B.A.
(Carleton), M.L.S. (Western Ontario), M.A.
(Carleton)
Janet D.Carson, B.A. (Bishop's), B.A. (Ottawa),
M.A., M.L.S. (Western Ontario)
Gail Catley, B.Sc., M.L.S. (McGill)
Bozena Clarke, B.A. (Carleton), B.L.S. (Ottawa),
M.L.S. (Toronto)
Ingrid Draayer, B.A., M.L.S. (Toronto)
Paul K.G. Filotas, B.A., B.L.S. (Toronto)
Leslie Firth, B.A. (Ottawa), M.L.S. (Western
Ontario)
Martin Foss, B.A. (Alberta), B.L.S. (British
Columbia)
Joan Fraser, B.A. (Queen's), B.L.S. (Toronto)

Alison Hall, B.A., B.Mus. (Carleton), F.L.A.
Anita Hui, B.A. (Hong Kong), M.A. in Library
Science (Wisconsin), Cert. Of Advanced
Studies (Chicago)
Susan L. Jackson, B.A. (Carleton), B.L.S. (McGill)
Isla Jordan, B.Sc. (Waterloo), M.Sc. (Montreal),
M.L.I.S. (Western Ontario)
Callista Kelly, B.A. (Carleton), B.L.S. (Ottawa)
Elizabeth R. Knight, B.A. (Winnipeg), B.L.S.
(British Columbia)
Frances S. Montgomery, M.A. (Carleton), M.L.S.
(Toronto)
Colleen Neely, B.A. (Carleton), M.L.I.S.
(Western Ontario)
Lida Palacek, Prom. Phil. (Charles, Prague)
Dorothy Rogers, B.A. (Wellesley), B.L.S.
(Toronto), M.A. (Yale)
Linda S. Rossman, B.Math. (Waterloo), M.L.S.
(Toronto)
Janice Scammell, B.A., M.A. (Carleton),
M.L.I.S. (Western Ontario)
Tatiana Schneider, B.S.C. (State University,
USSR), M.L.S. (McGill)
Judy Senecal, B.Sc., M.L.I.S. (McGill)
Ene M. Tikovt, B.A., M.L.S. (McGill)

Public Lectures at Carleton University

Carleton University Lecture Series

A distinguished series of lectures supported by Carleton University.

The Davidson Dunton Research Lecture

Established in 1983, the Davidson Dunton Research Lecture is presented by a Carleton University scholar who is active in research and has achieved international recognition. The lecture is in honour of former Carleton University President Arnold Davidson Dunton.

The John Porter Memorial Lecture

This annual lecture is sponsored by the Faculty of Arts and Social Sciences in memory of John Porter, former Vice-President (Academic) at Carleton University and a distinguished sociologist. The series was established in 1982.

President's Lecture Series on Business and Technology

Through this annual lecture, national leaders in business and technology are invited to campus to share their insights. This series was established in 1999.

The Marston LaFrance Research Fellowship Lecture

The fellowship was established in 1979 by the Faculty of Arts and Social Sciences in memory of Marston LaFrance, former Professor of English and Dean of Arts at Carleton University. Each year, the recipient presents a seminar or public lecture on some aspect of the research conducted while on the LaFrance fellowship.

The Gerhard Herzberg Lecture

Established in 1975 by the Faculty of Science, this lecture honours Gerhard Herzberg, a former Chancellor of Carleton University and recipient of the 1971 Nobel Prize for Chemistry. The purpose of the lecture is to emphasize the relationship between science and society and to address an aspect of science which has a pronounced impact on our daily lives.

Kroeger College Annual Lecture in Public Affairs and Civic Society

The Arthur Kroeger College Annual Lecture in Public Affairs and Civic Society provides an opportunity for leading figures in public, private and not-for-profit sectors to reflect on issues confronting civic society and on their own contribution in dealing with these issues. Speakers will include individuals who have played leadership roles at the provincial, national and international levels as well as those who have achieved broader recognition for innovative leadership at the local level. The lecture was established in 2000 and is intended to provide greater insight into the workings of government and the major institutions in our society.

Special Lectures

Individual lectures sponsored by various academic departments or endowments.

The Florence Bird Lecture

This annual lecture was established in 1987 to explore the experiences of women in Canada and abroad. It is named in honour of the Honourable Florence Bird, in recognition of her work for the CBC, CIDA, the Royal Commission on the Status of Women in Canada, and the Senate. The lecture is sponsored jointly by the Faculty of Arts and Social Sciences.

The Munro Beattie Lecture

This lecture was established in 1985 in honour of Alexander Munro Beattie, the founder and first Chair of the Department of English, in recognition of his outstanding contribution to Carleton University in teaching, scholarship and administration. The series is sponsored by the Department of English.

The Edgar and Dorothy Davidson Lecture

The Edgar and Dorothy Davidson Lecture was established in 1983 and is sponsored by the College of the Humanities. The lecture brings a prominent scholar in the area of religious studies and related areas to speak at Carleton.

The Dick and Ruth Bell Lecture

Established in 1988 in honour of the late Dick Bell and Ruth Bell. The lecture will be delivered annually by distinguished scholars in the field of political science or by distinguished persons serving or having served in the public life of Canada or one of its provinces. Supported through the Dick and Ruth Bell Fund.

The H.H.J. Nesbitt Lecture

This annual lecture was established in 1987 by the Faculty of Science in honour of H.H.J. Nesbitt, Carleton University's first Dean of Science. The lectures are presented by Carleton alumni who have earned international recognition

as scientists. The topics are of general interest to the public as well as the scientific community.

The McMartin Memorial Lecture

The McMartin Memorial Lecture is presented in alternate years by the College of the Humanities at Carleton University and the Faculty of Graduate Studies and Research at the University of Ottawa. The series was established in 1969 and is funded by Mrs. J.P. Gilhooly of Ottawa in memory of her parents, Mr. and Mrs. John McMartin. The lectures involve themes which promote the importance of ethical, moral, and religious standards to education and living.

The Sir John A. Macdonald Annual Lecture in Business and Public Policy

This lecture, organized by the Arthur Kroeger College of Public Affairs, is endowed by the Dominion of Canada General Insurance Company, of which Sir John A. Macdonald was the first president. The purpose of the series is to provide an opportunity for leading figures in public, private and not-for-profit sectors to reflect on issues at the intersection of public policy and business and on their own contribution in dealing with these issues.

Index

Notes

Notes

Academic Units and Programs

Carleton
UNIVERSITY

1942 **60** **2002**
carleton.ca